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EDMUND RUFFIN, EDITOR AND PROPRIETOR.

ACCOUNT OF THE EMBANKMENT AND CULTIVATION OF THE SHIRLEY SWAMP.

To the Editor of the Farmers' Register.

Shirley, June 26th, 1833.

Agreeable to your request I have examined my journal, and find the following result from reclaiming eighty-five acres of swamp land at Shirley. The swamp was heavily covered with gum and ash trees, and overflowed twice every day by the tide water at the flood, but left free from water at the ebb tide. The land was reclaimed in the year 1825, by contract, at the expense of $1.25 per running yard, for the dike, in the following manner. In the first place, a way about fifty feet wide was cleared on the line or route for the dike and then a ditch, about three feet wide and two feet deep, was dug throughout the course, for the dike to be run upon, to keep it from leaking underneath. The dike was then commenced at low tides, by digging pits in the most convenient places on the outside of the line of the dike, (and only on the outside, and never nearer the dike than twenty feet,) and loading wheelbarrows with the mud from the pits, which were rolled up to the dike on thick planks, and then deposited in a rough shape, until the whole line or course of dike was gone around, so as to give the mud time to settle and dry. The dike being seventeen hundred yards long, sixteen feet at base, four feet at top, and six feet high, it took about five months to go around it the first time, by which time it had settled so much as to require nearly as much mud the second time of going around as the first, to get it to its required size. On going around it the second time, the creeks (three in number,) were stopped out as they came to them by driving down four rows of large piles, or poles pointed at one end, and placed close together, quite across the creeks, so as to keep the mud from washing away as it was thrown in. The base of the dike at the creeks was fifty feet, and the dike made much higher and wider at the top than the other parts, to allow for the greater settling. After all the creeks were stopped, and the dike completed, a trunk, with a floating valve, (*Note A,*) made of very thick pine plank, was put down at the highest side of each creek, about twenty feet from the creek, with a ditch leading to the creek, to let off the water at low tide, but exclude it at high tide. The cost of dike, trunks and all, was $2167.50. The winter of 1825-26, I cleared fifty acres of the reclaimed land, by cutting down the trees, and burning them in heaps, but did not grub up the stumps. (*Note B.*) The spring of 1826 I merely listed up (very imperfectly) rows six feet apart, with the grubbing hoes, just wide enough to get earth to cover the corn, but did not pretend to grub up the large stumps or roots, even in this list. From the 12th to the 20th May, I planted the fifty acres in corn on the six feet lists two feet apart, as near as we could come at it, considering the rough state of the land; and on thinning out the corn, left three stalks in the hill. It produced a very heavy crop of stalks and a good crop of corn, considering the rough state of the land; the fodder fired before we could gather it all. The crop produced, as by journal, three hundred and eighty barrels of merchantable corn, and sixty-five of short corn fed to hogs. This crop was sold in the spring of 1827, at $3 per barrel, being $1140, besides the hog corn and some fodder.

The winter of 1826 and '27, I cleared the balance of reclaimed land, and in the spring of 1827 listed it in the same manner as last year, and planted the whole 80 acres* in corn, about the same time in May as last year—and had the promise of a very heavy crop of corn, until the storm of August 26th broke the dike in three places, and overflowed the reclaimed land, and apparently destroyed the crop of corn. I was at the mountains, and my overseer despairing of saving any part of the crop, did not pretend to repair the damages. But as soon as I heard it, I hastened home; and when I arrived, the tide had been flowing in and out for ten or fifteen days, and it required twenty days to repair the damages, (which was done with the plantation hands,) so that the corn had been subject to the tides for thirty days at least, and I was afraid was ruined; but fortunately the crop was matured before the storm, and all that stood up was saved—and I made about half a crop.

Crop made this year as per journal—merchantable corn four hundred and eight barrels and so much unsound corn that we did not pretend to measure it; fed some of the best of it to hogs; balance made manure of. Crop sold for $2 per barrel—amount $816.

I now found that the dike had settled or sunk so much that it would not do to risk another crop of corn upon the reclaimed land without raising it; and with my plantation hands, I raised the dike one foot higher during the winter of 1827 and '28.

In the spring of 1828, planted in the same way, and about the same time in May as last year, seventy acres of the reclaimed land in corn, and ten acres of the driest part in cotton. We had a very wet summer throughout, and made a short crop of corn on the reclaimed land, in consequence; and nearly a total failure in cotton. Crop as by journal, made on this land this year four hundred and fifty four barrels merchantable corn, fifty four good short corn fed to hogs, and a great deal of rotten corn. Cotton made—only six hundred and twenty pounds, picked or net cotton. This crop of corn sold for $2.40 per barrel, making $1089.60; and cotton was worth, I suppose, ten cents the pound, (though that was used on the plantation) which added to the corn, amounted to $1151.60. The dike now had so much sunk or settled, that we had to raise it again this winter a foot higher all around. The reclaimed land had also sunk a little and the stumps were disappearing by rotting.

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* Five acres of the area was at all times lost by being covered, or kept too wet, by the small creeks—so as to leave the whole quantity fit for cultivation, eighty acres only.

In the year 1829, cultivated reclaimed land as usual in corn, except that we only left two stalks in the hill to try to prevent the fodder from firing, which has always taken place before we could gather it all, but still it fires too soon for us. Made a very good crop of corn this year, seven hundred and sixty three barrels merchantable corn; seventy barrels short, but sound, fed to hogs; some twenty or thirty barrels of rotten corn, besides the above—price of corn this year $1.80 per barrel; value of swamp corn $1373.40. As I have neglected to mention the mode of cultivation, I will now do it. My reclaimed land is too low and wet to plough, except ten acres on the margin of the highland, so that we have to cultivate all of it except the above ten acres, entirely with hoes, which is done in the following way: The land is laid up every winter in six feet beds, with hoes, and well ditched and water-furrowed from one end to the other, so as to make it as dry as possible. We plant it as soon as possible in the spring, (which is generally the last of April or first of May,) two feet between every hill on the six feet beds, thinning out to two and three stalks to the hill. We begin to weed the corn broad-cast as soon as any grass or weeds appear. We generally get over it twice before harvest, and then the growth of corn is so rapid that it overshades the land, and keeps the grass and weeds under, so that the cultivation of this sort of land is much less laborious than any one would suppose from not being able to use the plough, provided you begin to weed as soon as any grass or weeds appear: but if you let them get the start of you, you may bid adieu to your corn, for all the hoes in Virginia would not save it.

In 1830, began to plant corn on reclaimed land on 20th April, and finished on 30th; cultivated as usual; we had a wet season, and bad for swamp land. Crop made this year, by journal, five hundred and fifty barrels of merchantable corn; seventy barrels of short corn fed to hogs, and fifty of rotten corn. I will here remark that this kind of land always has much more short and rotten corn than highland, and never turns out so well as the appearance of the crop, while growing, would induce you to suppose. I have often been told by persons who saw the crop while in the tassel, that it must make eighteen or twenty barrels to the acre, so luxuriant was the growth; but the best crop I ever made, was ten barrels and a half to the acre. But the beauty of this land is, that it will last for ever without manure, provided you keep the water off; and if ever it sinks to low water mark, which I believe it will, after a long while, why we can but use the pump as they do in Holland. It has now sunk about eighteen inches. Price of corn in 1830, $3.70 per barrel, and value of swamp corn $2035.

In the year 1831, cultivated reclaimed land as usual, except that we planted the corn earlier in April than before—and just as it was all up, on the 27th April, we had a violent N. E. storm, with high tides, which broke over the dike, and swept every thing; corn all destroyed—dike made a wreck of—and I was very near giving it up in despair, and in fact did give orders to break up some high land instead of it, but after awhile thought I would make another trial. Went to work on the dike, and by the 17th May stopped out the water again, and began to plant corn a second time. The corn came up, and stood very well, and I thought we had as good a prospect for a full crop as before the storm; for, by 30th May, we had completed the repairs to the dike and began to weed the corn, at which time it looked beautiful. The second day after we began to weed the corn began to disappear, and by the fourth day every plant was gone. The caterpillars, or a worm very like them, (somewhat smaller,) had eaten up every plant in the eighty acres, except a small corner of the reclaimed land, about two acres, where, on the subsiding of the flood, all the trash had floated to the thickness of four feet, and we had to burn it off before we could plant that corner. That part escaped the caterpillars entirely, their eggs being burnt, I suppose. I cannot account for the caterpillars, as we never had them before nor since in our corn, though we have had a few once or twice in our wheat, but not to do much injury. As I was pretty well tired of planting for one year, I waited until the glut of worms as I thought was over, and two days before harvest, the 14th and 15th June, I made a great push, working night and day, and planted the reclaimed land the third time. But it would not all do: the glut of caterpillars was not over; they were only concealed in the ground—and as soon as the corn came up, they again swept it off the face of the earth. After harvest, I thought it was too late to make corn in our climate, but determined to make the fourth trial, and began to plant on 30th June. The caterpillars had turned into a kind of fly and disappeared, and we made about half a crop. Crop made this year on reclaimed land, as by journal, of merchantable corn, three hundred and ten barrels; fifty two barrels of short, or hog corn, and thirty barrels of rotten corn, caught by frost. Price of corn this year, $2.25 per barrel: value of swamp corn $697.50.

1832, cultivated reclaimed land as usual in corn, and had no rain from June 3d until 24th September, the most unprecedented drought ever known in this climate. The swamp land corn suffered from the drought, yet we made there two-thirds of a crop: four hundred and sixty four barrels merchantable corn; forty-five barrels of short corn fed to hogs, and some rotten corn as usual. Price of corn this year, $3.25 per barrel; value of swamp corn, $1508.

Recapitulation of products and expense.

Years.	Product.	Sale.	Price per bbl.	When sold.
1826	bls. 380	$1140	$3 00	1827
1827	408½	816	2 00	1828
1828	454	1151 inc. cotton	2 40	1829
1829	763	1373	1 80	1830
1830	550	2035	3 70	1831
1831	310	700	2 26	1832
1832	464	1508	3 25	1833
		$8723		

Cost of reclaiming the land, - - - -	$2200
Interest for seven years on $2200, - - -	923
	3123
Amount of sales for seven years, - - -	8723
Balance, - - - - -	$5600

The corn used for hogs, and the fodder, &c. are not included in this statement of products. The labor of cultivation and repairs, (of which no cor-

rect estimate can be made,) should be deducted from the foregoing balance of $5600, to show the clear profit.

I ought here to remark that I have been obliged to add a foot to the height of the dike every year since it was reclaimed, and the year it was so wrecked, I had to add two feet, and yet the dike is now only one foot higher than it was first made—that is to say seven feet, so great is the settling of the dike. The general surface of the land since reclaimed has sunk about eighteen inches.

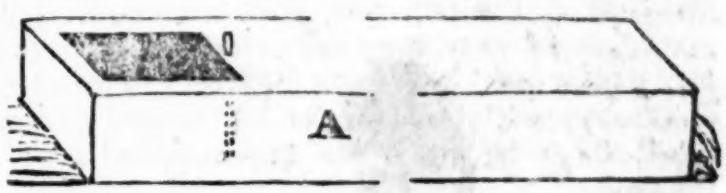
I have not been as much annoyed by muskrats as I expected, from the circumstance, I suppose, of our constant attention to the dike, and the constant working of the hands during summer, in the crop, and winter on the dike, so that the muskrats are scared off. A man goes all around the dike every day to see whether there are any muskrat holes and marks them wherever he finds them; and every now and then we select a low tide, and cut them out, and stop them up carefully, which keeps them sufficiently under for all purposes. I think the swamp mud is better for making a dike that is liable to the waves of the river or creek, than highland earth, as it is much more tenacious and less apt to be washed by the waves: and when a muskrat cuts through the swamp mud, it never washes larger. I have known a hole which could not be stopped out, for want of time and low tides, remain the same size for months at a time—so soapy and tenacious is our swamp mud; and but for its settling, it would be the very best material for dikes. When my dike was overflowed, if it had been of highland earth, or sand, it would have been all washed away—but the swamp mud stood it like wax, and only broke in the weaker parts. To future reclaimers of swamp lands I would advise the leaving a very wide margin of land between their dike and the river or creek, to furnish mud to repair and raise these dikes with, as well as to break the waves off; and never to dig a pit or hole, nearer than thirty or forty feet, (the farther the better) from the dike, as all pools or holes of water near the dike attract muskrats. Also never allow any earth or mud to be taken from the inside of your dike, as that is ruinous—for if you have any sink on the inside, the water will remain in it frequently, and will attract the muskrats; for wherever there is water, they cut a hole through the dike to communicate with it. The greatest security against them is to have your reclaimed land free from water, on the inside at least—have no ditches near the dike if it can be avoided; but if you are obliged to have ditches, let them run perpendicular to your dike, and not parallel, so as to present the least surface of water, and thus offer as little inducement as possible to the muskrats to cut through the dike. Build the dike of the mud or earth from without, and take it as far off from the dike as possible. With good planks and wheelbarrows, it is almost as easy to take the mud from fifty, sixty, or one hundred feet, as nearer, and you will save by it in the end. The further off you go for your mud the better.

HILL CARTER.

[NOTE A.]

The trunks to let off the rain water, or any water which collects on the reclaimed land, are made in the following manner: For a dike sixteen feet at the base, take two pine planks, twenty-six feet long, fourteen inches wide, and two inches thick at least (three would be better,) for the sides of the trunk: then with plank of the same thickness, sawed into lengths of twenty-two inches, nailed on the bottom and top of the side planks with close joints make a trunk, leaving one end open and the other closed. Then about four inches from the closed end of the trunk, on the top, cut a hole eighteen inches long, and twelve inches wide to let the water through. Place a valve or door on the underside of the hole of the trunk, four inches wider and four inches longer than the hole, which will float up to the hole and close it, when the water is higher on the outside than the inside; but when the water is higher on the inside, it will sink by the pressure of the water, and let it off from the reclaimed land. The valve or door is kept from getting out of the trunk by a perpendicular pin, put through the top and bottom of the trunk and near enough to the hole to make the valve rise just under it, and close it. The valve or door should be made of two pieces of plank pinned together, one on top of the other, with the grain of the wood of each crossing that of the other, to keep the valve from splitting.

The trunk is then placed in a ditch cut through the dike to receive it, about half a foot below low water mark, to keep it always immersed in water, (which keeps it from rotting,) with the valve end on the inside of the dike, and the open end on the outside of the dike.



A.—The trunk.

P.—Horizontal plan of the top of the trunk.

b.—Aperture for the descent of water.

cc.—Floating valve, which rises to the aperture b, and excludes the flood tide.

d.—The closed end of the trunk.

e.—Upright pin, to secure the valve in its place.

[NOTE B.]

It is much better, I think, not to grub up and burn the stumps and roots, on first clearing swamp land, except in the list where you plant the corn, for several reasons. In the first place, it reduces the surface very much, which is very desirable should not be done. In the second, the stumps and roots keep a great deal of the ground from putting up in grass and weeds, and save that much labor in weeding; and third, the stumps and roots rot much sooner in swamp than in high land, and you get rid of them soon enough without the endless labor of grubbing them up. They will all disappear in four or five years, where the land is cultivated every year; and the land will not require bedding sooner than that, as it does not sink much until the stumps and roots decay.

H. C.

THE FOUR SHIFT SYSTEM.

The best rotation for James River lands, or any good wheat and corn soils.

To the Editor of the Farmers' Register.

I imagine no one will deny that the best rotation of crops is that which yields the greatest profit to the farmer, and at the same time enables him to improve his land the most rapidly. The great object is to combine both *profit* and *improvement*. By some systems, you may improve faster than by the above, but then you make much less profit; and by none, in a series of years, will you make more profit with the same improvement.

I think I cannot establish the above theory in a more satisfactory manner than by giving a concise account of the system practised on a James river farm for the last seventeen years, with what success I leave the reader to judge, from the product. In the year 1816, I came to live on Shirley, a farm of nine hundred acres,—six hundred and fifty of which were cleared, and which had been in the hands of overseers for many years previous, who cultivated it on the old-fashioned system of three shifts—that is to say, the first year in corn, second in wheat, and third in pasture—the most ruinous system that could be invented, taking into consideration the shallow ploughing, and waste of manure, or almost total disuse of it. By this system, the farm was so much impoverished, that it barely supported itself two years out of the three, when the two best fields were cultivated; and the third year, they had to bring corn to support it from other lands at a distance. The whole farm was covered with galls. I merely mention these things to prove the impoverished state of the land.

I will also state the crops reported to have been made previous to my coming here to live. From twelve hundred to fifteen hundred bushels of wheat, (sometimes not merchantable,) and four hundred to six hundred barrels of corn on either of the best shifts of two hundred acres each, was considered great cropping by the overseers; and seven hundred to one thousand bushels of wheat, and three hundred to four hundred barrels of corn on the third shift of two hundred and fifty acres, was considered still better, as that was the poorest. This was about six or seven bushels of wheat, and two or three barrels of corn to the acre, on the best fields, and much less on the poorest: so that it may be supposed the land must have been very much exhausted, and the management very bad. When I first came home to live I knew nothing of agriculture, and for the first three years continued the three shift system. But I soon saw that the overseer knew little or nothing of his trade, and what little he did know, did not practise; so that I dismissed him as soon as his term expired, and employed, for 1817, a man who was industrious, and one of the best corn makers in the state, (having been all his life in the great corn country on the Pamunkey.) From him I learnt how to make corn, but he knew nothing of wheat, clover and plaster, or any of the present modes of improvement. However, by the aid of good ploughing, and collecting all the manure which had been neglected for years on the farm, he made a better crop of corn on the poorest shift, than had been made for many years back, even on the best. He made eight hundred barrels. His crop of wheat in 1818, following this crop of corn, was indifferent, (being still on the three shift system,) only eleven hundred and fifty bushels. I saw that there was something wrong about this system, and began to read a little on the subject of agriculture, and soon discovered that the three shift system was totally wrong; and although I sowed clover and plaster, it would not answer. At the same time that I began to read on the subject of agriculture, I went frequently to visit my good friend John G. Mosby, who then lived in Curles' Neck on James river, and to whom lower Virginia, or at least lower James river, is more indebted than to any other man in the state, for the introduction of clover and plaster, and the fallow system—the three forming the sheet anchor on a farm; for when all seems to be lost they will save the ship.

From my friend J. G. M. (who by-the-by, was one of the best farmers in the state,) I obtained a great deal of useful information; and in the fall of 1818, adopted the four shift system, by throwing out the poorest field of two hundred and fifty acres, and making a standing pasture of it, and cultivating the other two shifts in four fields of one hundred acres each, instead of two, of two hundred acres each. This change required annually one field of one hundred acres in corn, a second in wheat after corn, a third in clover, and a fourth in wheat on a clover fallow: and the succession of crops on each separate field was in the foregoing order, of 1st corn—2d, wheat—3d, clover—4th, wheat. The standing pasture prevented the necessity of grazing the cultivated part of the farm, except occasionally. The effect was like magic. The crop of wheat after the clover fallow, in 1819, was 3715 bushels, (which I carried to New York, and got a high price for.) The crop of corn was tolerable, being four hundred and eighty-seven barrels. I now got fully into the clover, plaster and fallow system, and will now state the amount of crops, the seasons, the success, and failures, causes, &c. &c. and by way of fair comparison, will begin with 1816, the year I began farming.

Table of crops made upon the three shift rotation.

Year.	Wheat. Bushels.	Corn. Barrels.	
1816	1400	450	The 3 fields
1817	1475	800	amounting to
1818	1150	670	650 acres.

Crops made on the rotation of four fields, each one hundred acres, (until 1832.)

Year.	Wheat. Bushels.	Corn. Barrels.	Oats. Bushels.	Clover. Tons.
1819	3715	487		a little
1820[1]	1761	534		mowed
1821[2]	1668	375	1000	each year.
1822[3]	1720	387	1170	50
1823	2458	520	1751	30
1824[4]	5322	383	1500	25
1825[5]	2700	464	1000	40

REMARKS.

[1] Wheat nearly destroyed by rust this year: there was enough straw for four thousand bushels.

[2] Wheat again nearly destroyed by rust—

very heavy crop of straw. The oats made on forty acres of the corn land the preceding year.

[3] Rust on wheat again—the oats as before, and for the three next years on part of the corn land of the previous years.

[4] Including some inferior grain got from the screenings, the crop of wheat measured 5400 bushels.

[5] Rust again very destructive to the wheat.

Another change was made in 1826, and will continue through the remainder of the table, viz: the corn crops were altogether derived from the reclaimed swamp, then brought into cultivation, (as described in my previous communication,) and oats occupied the whole of the field before used for corn, and thereafter was the only spring crop of the rotation on highland, with a single exception in 1831. I will here remark that having a corn mill on the estate, which yielded enough toll corn to feed the laborers and raise the hogs, and the oats being more than sufficient to feed the horses and other stock, the corn became all (or very nearly all) a sale crop. Besides the crop stated in the table, we generally made enough cotton to clothe the negroes, and pork to feed them, all of which had been purchased under the former three shift rotation.

Year.	Wheat. Bushels.	Corn. Barrels.	Oats. Bushels.
1826	4030	445	2500
1827[6]	2945	408	6000
1828[7]	3300	508	1463
1829[8]	3150	833	2255
1830[9]	3681	620	2433
1831[10]	3860	562	2300
1832[11]	5900	509	good crop but used without thrashing

REMARKS.

[6] This was the greatest oat year ever known in our country. We threshed and measured only half the shocks, which made three thousand bushels, and the remainder, estimated at the same, was cut up and fed away in the straw.

[7] Ploughed in fifty acres of oats to ameliorate the land, having a large supply of the preceding year's crop on hand still. The effect produced by ploughing in the oats, did not justify the repetition.

[8] Some oats cut up for feeding this year and the next, are not included in the quantity stated for those years.

[9] Limed fifty acres fallowed land with five hundred casks of stone lime—the effect very considerable on the wheat.

[10] Two hundred barrels of this crop of corn were from twenty-five acres of the oat field, which is the only exception to the general practice of corn being excluded from the highland.

[11] Three hundred and twenty five acres in wheat, instead of two hundred as before, by an addition from the land before kept for pasture.

In the fall of 1831, the standing pasture (two hundred and fifty acres,) was divided into four equal parts, and one of them added to each of the four fields, so as to increase the size of each to one hundred and sixty-two and a half acres. This year (1833,) I have purchased two hundred acres for a standing pasture, to make my system complete: and the next winter, shall clear twenty-five acres more to add to my cultivated fields, which (with the twenty-five acres in lots kept for grazing,) will make seven hundred acres for cultivation, and two hundred for pasture, exclusive of the reclaimed land. I now expect to begin the reap the full benefit of my system of cultivation. The first four hundred acres may be considered as permanently improved, and the recent addition from the former pasture in a fair way of improvement, (as it is well taken with clover,) and the whole crops ought now to increase every year.

Since 1825, we have mowed very little clover, as the cultivation and other labors of the reclaimed swamp, have left but little time for hay-making. Consequently, nearly all the clover has been ploughed in to improve the soil.

In addition to the results above stated, I will now give my reasons for thinking the four shift system the best for our James River lands.

In the first place, one of the objects of the Virginia farmer should be to make as much as possible for each hand employed, as labor is much dearer than land in this country, and he cannot make a full profit to the hand without cultivating a tolerably large surface, which the four shift system enables him to do.

Secondly, no farmer can improve its land or keep up its fertility, without a great deal of manure, and that manure cannot be made without a great deal of offal, of which to make it. The four shifts with the standing pasture, give him more offal than any other system. The standing pasture supports stock enough through the summer, without grazing his clover fields, to convert his offal into manure during winter; and it is all important in this system not to graze your clover fields which are to be fallowed, so as to have a heavy clover lay to turn under, to restore the land after the three successive grain crops, as well as to make a good crop of wheat the ensuing year.

In the third place, it is my opinion that the more frequently you plough up your land, provided you turn under manure, or a good lay of some kind, (clover is the best,) the faster you improve it; and there is no system in which you can make so much manure, or so often turn under the clover lay as in this.

While on the subject of manures I will digress a little to mention some few experiments I have made; and will first state that it is of very little consequence (in my opinion) how you use your manure provided you really *do* use it. The great art is to make it, and that in large quantities. It is like money: any one can spend it, but few can (or rather will) make it, in any quantity.

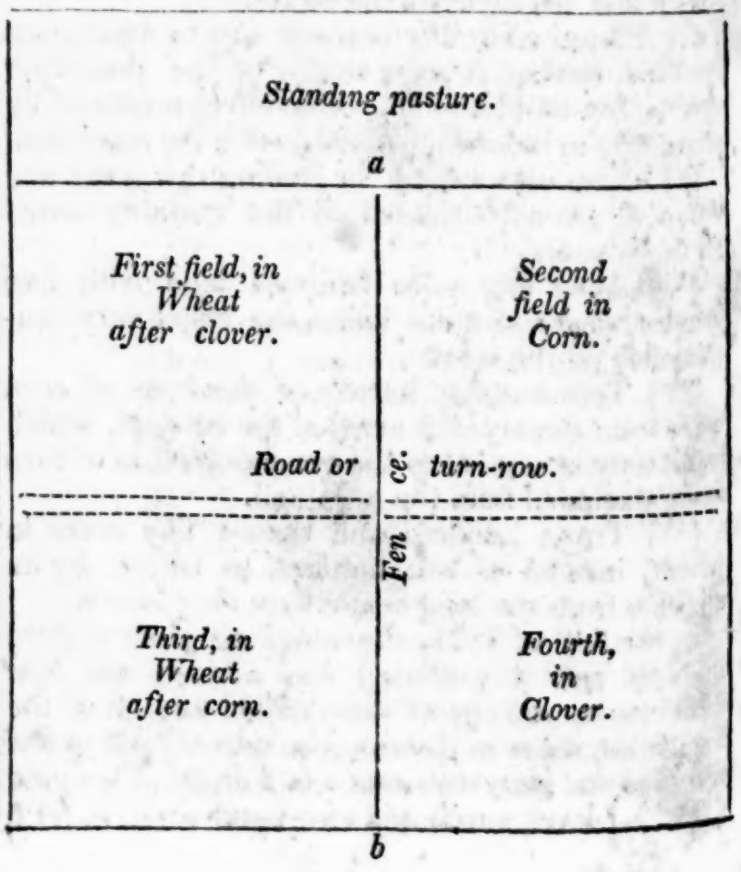
In the spring of 1828, I made the following experiment. My farm-pen manure, (which I generally apply by ploughing in with the clover fallow in the fall, just before sowing wheat,) was divided into four parts, one of which was hauled out early in April, and ploughed in—a second part was hauled out, and used as a top dressing on the clover which was backward and unpromising—a third was hauled out and left in heaps, (each heap a wagon load,) and well converted with earth until the fall, and then ploughed in just before sowing wheat; and the fourth was left in the farm yard, as usual with me, until the fall, and then hauled out, and ploughed in, just before sowing wheat. The top dressing produced the best wheat—that

which was left in the farm yard until the fall, the next—and that which was ploughed under in April, the worst. But in the crops since that time, there has been no difference visible; and all the pieces of land are very much improved, so that I am of the opinion stated before, that it is of little consequence how you use manure, so that is really used—and that it is spread well over the surface, which is very important. There is one exception to the above opinion, if it could be practised—but I have never seen the farmer in our climate in the lower country who could. I allude to the winter top dressing of wheat, which is certainly the quickest in its effect, and the most permanent in duration; but we can never use it in that way to any extent in our climate, for several reasons. Our winters are so short, and the ground so rarely hard frozen enough to haul upon, that it is impossible to do much at this kind of work. We are compelled to bed and furrow our land from one end to the other, and if heavy wagons were to run upon it in our wet winters, (and they are always wet,) both the land and wheat would be ruined. But I have not the least doubt, if it could be effected, that it is the very best way of using manure. If done early after sowing wheat, it improves the wheat very much, and it insures a heavy crop of clover after wheat, for it protects the clover from the spring frosts, and enables you to sow your clover seed early, which is very important on weak land; and then, in the summer, it protects the young clover from our hot sun and great droughts which we frequently have. I consider a good crop of clover as equal to two manurings, and it is that which makes the top dressing in winter so durable, because it secures the clover. I top dress a little, though very little, every winter, as much as we have hard frozen ground to do it on; and I am sure that I can go now and point out every spot that has been done so for the last ten years, so permanent is this way of manuring. There is frequently great waste of manure from applying too much to the acre. The object of the farmer should be to cover a large surface with his manure, just applying enough to make the clover take well, and by plastering his clover he will have the best possible manure in a good clover lay. My practice is to put twenty-two good wagon loads of stable manure to the acre, and thirty very heavy wagon loads of farm pen manure to the acre; (as that is very inferior to the stable manure,) and in that manner I get over about 50 acres of land per annum.

I will now return to the reasoning on the four shift system. In the fourth place, our lands are very liable to weeds of every kind, to onions, blue grass, wire grass, partridge pea, and many others, so that they require a spring hoe crop very frequently to keep them clean; the four shift system, with corn every fourth year, will do that very effectually. I have tried the oat crop instead of the corn crop as a cleanser, but it will not answer. The oat crop is an effectual cleanser of onions for the time being, that is to say your crop of wheat for two or three years after the oats will be perfectly free from onions, but they will return after a while if you stop the oat system. But the oats do not in the least prevent the growth of blue grass, wire grass, or partridge pea, and a hoe crop is the only remedy. I shall now be compelled in my sorrow to abandon oats as a cleanser, and substitute the corn crop, so foul has my land become of every thing except the onion, which the oat crop has kept under. I have this year lost one third of my wheat by blue grass. I consider the oat crop, if a heavy one, fully as exhausting as the corn crop; and I do not regret being obliged to abandon it and take up the corn crop, on that account, but I regret it on account of the onion, of which the corn crop is not half so good a cleanser; and besides, I shall find it too laborious to cultivate one fourth of my land in corn, in addition to my swamp land: but it must be done—there is no alternative, for the blue grass must be checked.

The fifth and last reason in favor of the four shift system, with standing pasture, is, that it requires less fencing than any other. You may have your four fields either under one fence, or divided into two equal divisions, with a fence to each, which is the most convenient, as you may then occasionally graze your fields, when it will be least injurious.* It will be found that the non-grazing system will not do altogether; for after a while the land becomes too much puffed up, and too full of vegetable matter, to make a good crop of wheat. That may be remedied though, by grazing immediately after hauling off your wheat every year: and provided you take your cattle off whenever the ground is too wet it does not injure the young clover in the least, but rather benefits it; for clover, like wheat, requires the hoof on the land occasionally, or the land becomes too porous and puffed up by the vegetable matter; and besides, the young clover is very much protected by the growth of weeds which require breaking and trampling down.—You may graze your fields from which you have taken your wheat, until you put your cattle up into winter quarters, with the foregoing precaution in wet weather. But never suffer any thing to run on your clover field the year you expect to fallow it. It is that which I have heretofore spoken of as so objectionable.

* By the following diagram it may be seen, that if the four fields can be laid off by two lines intersecting near the middle of the cultivated land, the half on the left, and that on the right, will alternately be in wheat, and therefore that a single dividing fence, (*a*, *b*,) will suffice to permit half the land to be grazed, after it is cleared of the crop of wheat.



I have frequently remarked that a field of clover which was grazed moderately while young (from the time the wheat was taken off until the time to put cattle up into winter quarters,) would take a much earlier start the next spring than one which had not been grazed, owing to the weeds in the latter case choking up and keeping back the young clover.

The standing pasture may be made of the most inferior land on the farm, which will, in the course of some years, be very much improved by it; or you may convert your woods into a standing pasture by enclosing them, and clearing up the undergrowth, &c.; and frequently on farms, there are swamps, marshes, or strips of land that cannot be cultivated, which make very good standing pastures; so that, in the two last cases, you have all your cleared land to cultivate. One of the strongest proofs of the superiority of the four-shift system, is that my friend Selden of Westover, who has adopted it, now makes double as large crops as his predecessors did, and has put entirely a different face on the land: though he would make good crops under any system, for he is a first rate farmer.

HILL CARTER.

A NEW MODE OF REARING ASPARAGUS.

June 17th, 1833.

To the Editor of the Farmers' Register.

Yours of 31st ultimo was received, and with great pleasure I now comply with your request to furnish you with my plan for making asparagus, which you are at liberty to publish in any form you may think suitable, provided you do not mention my name.

The asparagus seed should be sown from the middle of March to the last of April, in a rich spot, (not too much exposed to the mid-day sun,) one inch deep, and the seed one inch apart; after they come up, to be kept clear of grass and weeds during the summer, by hand weeding; to be dug up the next fall or spring—(I prefer the spring, as the roots do not grow during the winter, if set out in the fall, and are liable to be killed by a severe winter,) and set in beds prepared as follows: Dig out the size of the beds nine inches deep—cover the bottom three inches deep with rich marl, (which has been my practice,) though I believe that oyster shells half burned will be as good, as it is intended as a lasting heating manure to protect the roots in winter, and force the vegetable early in the spring: then put three inches deep of coarse stable manure, then three inches of rich earth. This brings the beds on a level with the surface of the earth. Next lay off the beds in rows eighteen by twelve inches apart, and put a single eye or spire in each spot where the lines intersect, and cover them three inches deep with rich earth. Plank the sides of the beds, as this prevents grass and other roots from running into the beds, and also keeps the outside roots from being exposed, by the sides of the beds washing away. The beds should be kept clean by hand weeding, and all the earth and manure used in making them, should be perfectly free from grass roots and noxious weeds. In the fall of the year after the seeds have matured, cut the tops off close to the beds, (being careful that not a single seed is left to vegetate on the beds,) as they have already as many roots as the space they occupy should contain, and if additional roots are suffered to form from year to year from the falling of the seed every fall, the beds will soon be so much clustered with roots that the vegetable must degenerate, at least in size and length, as the new roots form near, or on the surface. Some prevent this by burning, but I think the best way is to pick them off by hand, before the ball that contains the seed breaks. You then top dress the beds with coarse stable manure, let it lie on all winter, and in the following spring rake off the coarsest part, and fork in the remainder, being careful that the fork does not touch the roots. Pursue this course two falls, and early in the third spring, before the beds are forked up, put on two inches of light well-rotted manure—fork it in with the stable manure, then put on from three to four inches deep of clean sand from the river shore, and you will cut in the month of April the best vegetable we have in Virginia. I would not give my beds for the balance of my garden. I think there is much in the kind of seed. I have a gallon, and if you will say how they must be conveyed, I will with pleasure send you some. I obtained my seed from New York; they were marked "giant asparagus."

The cover of sand is important on several accounts; its being a great absorber of heat and moisture, so soon as the vegetable gets through the soil, it is hastily thrown through the sand to the surface in a bleached tender state, and the cuting from day to day is more uniformly of the same tender delicious vegetable. The sand also prevents grass from growing on the beds, which obviates the necessity of so much hand weeding during the season for cutting, by which the beds frequently become trampled and the vegetable that is about to come through the surface mashed down, which not only destroys the spires that are so trampled on by the gardener in the process of hand weeding, but (I think) injures the root.—The sand should be laid in the alleys between the beds, in the fall, when the beds are about to receive the top-dressing of stable litter to keep them warm through the winter; and when the sand is about to be replaced in the spring, it should be passed through a sieve of such size as will not let the balls (that contain the seed) pass through. This will be another means of preventing the seed from vegetating on the beds. There is a practice very prevalent with gardeners to plant lettuce, radishes, and other early vegetables on the beds; this should never be done, and particularly with radishes, as they have a long root that extends to the roots of the asparagus, and must seriously interfere with them.

I frequently cut asparagus from three to five and a half, and once I cut a spire six inches in circumference, and from five to eight inches long; it could have been cut longer, but it is never tender near the root.

We have complied with the command of our esteemed correspondent by withholding from the foregoing letter a signature, than which no better can be offered as authority for any statement of facts. But in any form that may be most agreeable to himself, we shall be always pleased to receive and publish any result of his practical and successful operations in improving and cultivating the soil. Until we can make permanent arrangements for such purposes, the seed which he offers may be left with Mr. White, the printer of the Farmers' Register, who will distribute them among any of our patrons who will make application.—[*Editor.*

For the Farmers' Register.

SPLITTING ROCKS WITHOUT GUNPOWDER.

In the early periods of civilized life, in several parts of Asia and Africa, when architecture became an object of special study and practice, the mode of procuring the most durable materials became desirable. It is natural to suppose that various expedients had been resorted to, for splitting blocks of stone from the solid rock. The idea, however, occurred of applying intense heat, by laying the fuel, on fire, in a longitudinal direction and in the case of the rock being limestone, the part burnt being scraped away, a hollow was formed, and the heating resumed. This operation continued a certain length of time, say a few hours; the embers and ashes were moved aside, and water poured into the channel, the splitting of a considerable portion of rock proved, generally, the result.

From the remains of some ancient fortifications in Europe, particularly those in Scotland, it appears evident that the blocks of stone of such immense size, could not have been split by any other means than by fire and water. Those castles situated in several parts of the highlands of Scotland, bear evident marks of such a process as here alluded to. The blocks are square, but show no mark of a hammer or chisel upon them. The particular sort of stone (basalt) in some of the castles on the north and western coast of Scotland seems to agree in quality to that of some mountains situated several miles off; and the rocks, to this day, bear evidence of having been broken off by this process of splitting. Though abundant evidence seems to support this practice in ancient times, the introduction of gunpowder in Europe most probably superseded this ancient practice of contracting matter by heat and expanding the same by cold water; so the practice has been, for ages, forgotten, until some accident or expedient revived it lately. It seems that in some instances if the fire train be judiciously managed, the rock will split to an amazing extent. The success of the split might be further ensured by forming a longitudinal ridge, hollowed out by picking in the intended direction. This ridge sufficiently heated, say for a few hours, then the water poured into it will accomplish the desired object.

Contractors of public works will find it advantageous to try the experiment; a few trials will enable the workmen to become adepts in this new art. The result will generally prove more extensive than that produced by gunpowder; besides the operation of boring is very tedious and expensive.

It is a frequent occurrence, when stone of any sort is heated and accidentally wetted, the mass instantly cracks. Whatever direction can be given to the heat and the pouring of the water, the crack is sure to follow, and extends in proportion to the intenseness of the heat.

This practice bears some analogy to that adopted in some parts of Europe, in hewing mill stones. A block of stone is hewn in the form of a column, and about five feet in diameter, out of the solid rock. At about the usual thickness of a mill stone several tiers of dents are dug all around this column; the tiers, dents, or ridges, are at regular intervals, corresponding with the required thickness of the mill stone. These dents being completed, a set of wedges are made of poplar, or any other soft wood, and dried in an oven. These are then rammed into the dents, at regular distances around the block. After the wedges are fixed, their projecting ends are wetted. To ensure the expansion of the wedges by the moisture, it is desirable to have a hollow scooped out of the upper surface of the wedge in the fixed state, so as to receive a small portion of water. The water thus penetrating through the dried and contracted pores of the wood, will soon expand to such a degree as to split the block at every tier of wedges.

It frequently happens that this operation of wedging is the last. When the men cease their labors in the evening, the wedges remaining fixed over night, the workmen invariably find, on their return in the morning, the tiers of stone split through. By this simple means immense labor is abridged to a mere fraction; the force of expansion is here exerted to an amazing extent. The principle, too, is exhibited with advantage. Were men of public spirit and enterprise to give this plan a fair trial, the result would amply reward them.

Canals and rail roads can, by these means, be constructed through hills and valleys, at a fraction of the usual expense.

A TRAVELLER.

For the Farmers' Register.

EXPERIMENT AND OBSERVATIONS ON THE FERMENTATION OF MANURES.

It has been often said that the experiments in agriculture which result in failure and loss, if correctly reported, would be scarcely less instructive than the smaller number which prove successful and profitable. All will assent to the truth of this opinion, but few are willing to act in accordance. I propose submitting a report of this character to the readers of the Farmers' Register, in which errors caused by ignorance and inexperience, are at least as conspicuous as correct views; and as much of value was lost, as secured by my operations. Still, I am persuaded that even from my erroneous management and mistakes, I have received profitable lessons, and that my facts and observations may also be useful to other farmers, even if my deductions are not altogether correct.

Circumstances enabled me last winter, for the first time, to devote a considerable amount of labor to the collection and preparation of vegetable matters for manures. Having but little confidence in the truth of my own opinions as to the best management of manures, and not more in any or all of the innumerable writers on this subject, I determined to test my opinions by experiments, and to record my observations minutely for my future use. This journal of my operations, with but few alterations in form only, will constitute the present communication. Entertaining the opinion that the fermentation of coarse manures is necessary, but that great and needless loss is caused usually by that process, it was my aim so to conduct the fermentation as to avoid as much as possible the usual loss of its products.

A new site was chosen for the barn and threshing machine, the most convenient for making manure, as well as for storing the grain crops. Between the barn on one side, and the place intended for the stables and corn cribs on the other, a space of fifty yards square was marked off for the winter cow yard. In October 1832, the middle of this space was dug out to the depth of fifteen inches, and the earth moved in carts and deposited on the outer twelve feet of the square, so as to form, when

completed, a basin, the middle of which was two and a half feet deeper than the raised surrounding border. This border was intended to form a dry resting place for the cattle, and also to keep in the fluid parts of the manure, and to keep out rain water from the adjacent higher ground, which (it was feared) might otherwise have made the litter too wet for the comfort and health of the cattle. The soil was a sandy loam, about six inches deep, and the subsoil becoming a sandy clay about eight or ten inches from the surface—not quite close enough to keep water from sinking, but would become so by being trampled. The middle of the basin was of this subsoil, while the outer edges and the raised borders were mostly of the lighter soil. The yard was enclosed by a straight fence—and along the north side and partly on the adjoining east and west sides, a sloping slab shelter was made to protect the cattle in bad weather.

All the cattle except working oxen, grass beeves intended for early slaughter, and milch cows, were penned here at night from October 15th, and a slight littering was given at first of straw and leaves, (heaped in the woods the preceding winter) and which was increased somewhat every day, by similar materials, and soon after by the stalks of the first gathered corn. As the cattle were turned, during the greater part of the day, into a clover field, they eat little or no dry food for some weeks, and during that time no more litter was given than enough to absorb the animal manure. Afterwards corn-stalks and straw were added rapidly, and leaves as often as the other labors of the farm permitted them to be hauled. The raking of the new crop of leaves for litter, was begun October 29th, on a few acres of land covered exclusively by pines of the second growth. Pine leaves, which are considered the best for manure (and certainly are the heaviest and easiest to manage) begin to fall early in October, and by the 29th had nearly all fallen, when the leaves of deciduous forest trees were just beginning to drop. Being satisfied that every rain which falls on them afterwards, extracts some of their enriching principles, I wished to have them heaped as soon as possible after falling. At any time, leaves must furnish a poor material for manure, and much more so as usually gathered after exposure to a winter's rains. My later raking (as leisure permitted through the winter) was in woods of mixed pine and oak, part of which had been raked over the winter before, and the balance never, so that old as well as new leaves were brought in. Besides the leaves, the materials for manure were, the stalks and other forage of a crop of 560 barrels of corn, and the straw of 2000 bushels of wheat—and perhaps 9000 pounds of clover hay. These were for the stable and other pens hereafter to be described, as well as this, on which no food was used except straw, cornstalks, shucks and tops. The number of cattle from October 15th to December 22d, on this large pen, was thirty-five on an average; and forty-five after that time.

Nine mules were kept in a littered, unsheltered pen, and three horses in covered stalls in the same enclosure. The manure there made before the 12th of October, had been moved out and ploughed in for wheat, and the yard and stalls were then littered again with old leaves and straw, and (from neglect) not enough was given either for making manure, or for the comfort of the animals, until December 22d, when the litter was found to be only from four to six inches deep, compactly trodden, and wet throughout—enough so in some places for fluid to trickle from it, when dug into for examination. The horses and mules were regularly worked, and fed plentifully with corn as well as fodder or clover hay.

A third pen was for eleven working oxen, in which they had been penned on litter and fed with hay or other long forage, since October 4th. They were generally kept at work.

December 24th.—After sixty hours continuance of temperature below the freezing point in the shade, (and the nights much colder) examined the warmth of the litter in the three pens, between 9 and 10 o'clock, A. M.

The litter of the ox pen (which for distinction will be called No. 1,) was 14 inches thick in the middle, and lessened to 8 near the edges—compact and moist, but drier than the mule litter. Two different places showed the following degrees of temperature.

1st place, at 6 inches deep - - -	47°
— — 10 — — - - -	49
— — 14 — — (the bottom)	56
2d place, where thinner,	
At 6 inches - - - - -	47
9 — - - - - -	52

The mule pen (No. 2,) when in the wet state above described, had two days before been well covered with dry leaves. In three places at the bottom of the litter and touching the earth, the temperature was 48°, 49° and 47°—and at a less depth immediately over the two first, the thermometer showed 46° and 44°.

In the farm yard (No. 3,) owing to the small number of cattle compared to the space, the litter was not made compact as in the other pens, and several inches of the top, which had been laid on since the last rain, (two weeks before) was loose and dry. The moist and more compact, was ten inches thick in the middle, the deepest part of the yard, and not more than four on the outer parts.

Temperature of three different places, in compact litter, where thickest,

6 inches deep -	55°	58°	57°
10 — — -	47°	58°	55°
In thinner parts of the litter,			
At 3 inches deep	50°	*52°	*50½°

The two last (marked*) were under the shed on the raised border, and were most exposed to the sun from the south. In this yard, the thickest part of the litter was the warmest—and the middle of the bed was generally warmer than the bottom. In the ox pen the litter was evidently best rotted (or the texture most weakened by commencing fermentation) though this effect was very slight. The mule pen litter, which is much the richest, but is also the thinnest and wettest, had the lowest temperature. *Query*: Had not the recent cold weather lowered the warmth previously acquired from fermentation? The litter of the fattening hog pen, which was mixed with a large proportion of earth, was 42—and the inside of a dry stack of fodder (examined for comparison) at 18 inches from the outside, and 6 inches from the bottom, was at 40°. The lowest temperature of the manure being 7° higher, showed that fermentation was going on.

January 1, 1833. A heavy soaking rain, and

the weather very warm for the season. As soon as the rain ceased, began to dig up and heap the manure of the ox pen, (No. 1.) The oxen had not been on it since December 22d, when they had been moved to a part of the farm yard (No. 3.) January 2d, at 9 o'clock A. M., the temperature of the air in the shade was 51°—and at the same time the manure not yet heaped (though it had been somewhat loosened by the hoes the evening before, and *possibly* fermentation might have been thereby excited,) was 65° to 71°, in different places. The heap made between 16 and 18 hours before was already throwing out warm vapor, smelling of ammonia, and within the bulk was found to be 99°. This unexpected heat and the ammoniacal smell was unexplained then; but afterwards, when using the manure, I learned from my overseer that when he began the heap in my absence, 20 or 30 hand-barrow loads had been brought and thrown on of the rich litter of the covered horse stalls—but finding it too dry for heaping, he had stopped any further addition.

The heaping which had ceased since the preceding night, was now resumed and finished. The whole heap, thrown up lightly by forks and shovels, and not trodden, (except a little at the last to shape the top,) was raised to seven, and in part to eight feet high, the sides cut down as steep as they would stand, and the top left depressed in the middle. A cover of wet leaves (which had been laid in the adjacent road to be trodden and absorb water, but contained no dung,) was thrown over the top to the depth of twelve inches, lying as they fell from the shovels. Over the leaves, soil was thrown about four inches deep, and then sowed thickly with oats. This cover of earth was given, first to keep the whole surface of the manure moist, instead of its drying and remaining unchanged six or eight inches in, as when left uncovered; second, to cause all the seeds of cheat and other weeds to sprout, and by that means to perish; third, to absorb the escaping gases, if that is possible; and fourthly, to use those gases in feeding the growth of oats, both to add to the bulk of manure, and to furnish a test or measure of the escape of rich aeriform fluids. The escape of visible vapor ceased with the adding to the heap. No fluid trickled from the heap, which showed it was not wet enough.

The litter of the other yards having been recently added to largely, was not wet enough to heap. No. 3. tried in different places, was at 60°, 61° and 62°.

I had never heaped manure before, earlier than the beginning of spring weather. My object now was to have the fermentation completed with as little excess of heat as possible, and to avoid the great loss usually incurred from violent fermentation. If fermentation would go on, it seemed that cold weather would be the best to keep it moderate.

From January 1st to 4th, warmer than usual for the season, and much more so from the 4th to the 7th. Rain on the 7th, and at night the first snow that had fallen during the winter, and a change to cold weather. Several rains and more snow by the 10th, when it became excessively cold, and continued so until the 12th. Thermometer not observed out of doors, but was at 20° between 8 and 9 o'clock A. M. on the 11th, in my passage, which is between two rooms with good fires, and in one of which a fire was kept up through the night as well as day. On the 10th, the litter of mule pen (No. 2,) was heaped when very wet, and mixed with the litter of the covered stalls. Being absent at the time, no observation was made by the thermometer; but from the extreme coldness of the weather, I suppose that every part of the manure must have been reduced nearly to the freezing point by exposure to the air, as it was thrown on the heap. To have as little of surface as possible, and to prevent the mules treading on the manure, the heap was made to fill a round pen of six feet high, and raised above four feet still higher in the middle, or ten feet in all.—No cover of earth or leaves had been laid on. When I first saw the heap, on the 12th, there was no outward sign of fermentation having commenced; and, at eighteen inches depth from the side the temperature was 42°. I feared that it would not begin to ferment, without a complete opening and second heaping. Dark colored fluid had exuded from the heap, and continued to do so for some days later, forming puddles around the base.

The heap No. 1, by January 12th, had sunk to five and a half feet high. Most of this loss of height must have been caused merely by the compression of the loose litter. No vapor had been seen to escape since it was finished, whence I supposed that the cover of earth, by its pressure, had stopped the fermentation. But on striking into the heap with a grubbing hoe, warm steam came out. Before this, there was no outward indication of the slightest warmth, except that the outside was thawed in a few spots, and snow was but thinly sprinkled on a few other places, though the ground was covered more than an inch deep. The fermentation however had been sufficient to rot the manure enough for me to thrust the helve of a hoe two and a half feet in the side without much effort. The thermometer put into holes so made in different places, and about eighteen inches from the surface, showed the following degrees of temperature:

118° on the north side, three feet from the ground, and where the mixture of stable manure was made.
100° south side, at the same height.
78° another place.
68° — — one foot from the ground.
64° — — — — —
62° deeper in the same hole.

Poles had been placed in the heap to show the temperarure by drawing them out and feeling them. This had been done on the 10th, and it appeared that the heat was greatest about two feet from the outside. But few of the oats had yet come up, and those mostly on the south side, showing that the heat of the sun, more than of the manure, had caused them to sprout.

On the 14th was the first thawing in the shade, and indeed there had been but little in the sun.—Observed a barely perceptible escape of vapor from a fissure, in the crust near the top of the oldest heap, (No. 1.) Began to cut away the outer part of one side of the heap, (where the greatest heat had been found,) for the purpose of examination, and to use some of the manure in an experiment. A perpendicular section being made, showed that the manure was enough rotted for use, (about half rotted,) from the outside cover of leaves, to two, or two and a half feet deeper in.—This best rotted part was still very warm, and in

different places showed the following degrees of temperature—118°, 110°, 110°, and 100°. Some spots were "*fire fanged*" or mouldy—and these were evidently caused in most cases by the mixture of stable manure, which I then first learned had been made. In some of these mouldy spots, the heat was 142° and 146°. The interior and lower part of the heap, from the earth to two and a half feet high, was 116°, quite moist, and more so than the upper part, but was very little reduced by rotting, from being so much compressed. The vapor poured from all this digging as from a kettle of boiling water. By the next day all visible escape of vapor had ceased, except a barely perceptible issue at a fire-fanged spot—but it again poured out, though in less quantity, upon cutting with a a hoe, for inspection. At eighteen to twenty-four inches within the perpendicular cut, in the upper and most rotted part, the temperature had fallen to 96°—and to 90° and 92°, at the same distance within the lower and unrotted part. In a fire-fanged spot it was 112°. Dug into the opposite (south) side of the heap, and discovered no mouldiness, except a spot so small that it would have escaped common observation. On this side, the unrotted manure came nearer to the surface. Temperature two or two and a half feet in, was 93° in the most rotted, and 92° in the least. The weather had become much warmer within the preceding twenty-four hours.

The observations made on this body of manure seemed to justify the following inferences: 1st. That the heap was made two high, to allow the lower part to rot speedily; 2d. that the heat and moisture remaining in that bottom, proved that the fermentation, though retarded, was still going on, and in time would be effectual; 3d. that as no perceptible vapor had escaped (with a single slight exception stated before) after the heap was finished and while covered, there could not have been any material loss of fertilizing matter, from the process of fermentation. A paper moistened with diluted muriatic acid was exposed this day (January 15th,) to the vapor, as was also the open vial containing it, and no dense fumes were produced, which Davy tells us would indicate a loss.

On the 14th, began to heap the litter of the farm-yard (No. 3,) making the heap in the middle and lowest part. The litter there was eighteen to twenty inches thick. The part which remained to form the foundation of the heap, (as was done in the other cases,) was first dug and well loosened before throwing more on. The temperature was highest in the thickest part of the bed, and in different parts of the yard was 66°, 64°, 55°, 62°, To my surprise, after so much rain and snow, the litter was not saturated with water, nor indeed was every spot moist. Fearing that this would make fermentation imperfect or irregular, stopped the work, after making the heap about seven feet high, on a circular base of twenty to twenty two feet across. Fenced it around, to prevent its being trodden by the cattle, and filled the space on the yard just cleared, with fresh litter.

Notwithstanding the change to warmer weather, this heap (No. 3,) was, on the morning of the 19th, still so much frozen on the surface generally, that on walking on it, my weight did not always break the crust of frozen litter, though the lightness of the mass caused the surface to be depressed where trodden upon. Vapor (which seemed altogether watery, from its want of odor,) was issuing from one point, the highest of the heap.—The thermometer sunk two feet in that place, showed 74°. No where else did the heap exhibit any evidence of fermentation being excited. In the side, one foot in, it was 50°.

No vapor was issuing from either of the two older heaps. No. 2 showed a slight internal warmth, (not measured,) but no vapor from pulling out a stick thrust in three feet deep. The heat, had increased somewhat by the 19th, but still no vapor perceptible, until the heap was dug into for examination, when it issued, but as from a very moderate internal heat. The thermometer at a foot and a half below the top showed 66° only—and on the slope and something deeper in the body, 77°.

The oldest heap (No. 1,) was examined also on the 19th on the south side, and deeper in the same place tried last. The rotting had gone still lower, not more than a foot of the bottom now remaining quite unrotted. The general temperature was much lower, (which was very desirable,) except in the unrotted bottom. This part was at 74° near the junction with the more reduced body above, and 60° in a mass of wet straw, which had not even changed to a dark color. The upper and more rotted part was in different places, 72°, 80°, and 94°—the last in the only visible fire-fanged spot, and where most vapor showed, upon digging in the the mass.

From the heap commenced in the cow-yard, (No. 3,) vapor was now issuing at most parts of the top—and on thrusting a stick down two and a half feet through the loose and open materials, where most vapor came out, the heat was found to be 123°—and 106° at another place. The sloping sides slightly frozen, and at one foot and a half in, showed 50° only. The vapor, from its want of odor, seemed still to carry off little or nothing except moisture. On the 21st, it issued still more abundantly from the top, and conveyed a scent of rotting vegetable matter—not ammoniacal. Temperature 124° at one foot and a half deep. This heap was not only too dry, but was certainly of very poor materials, and its rapid and violent fermentation was quite unexpected. Was it caused by the loose and open texture of the mass, and the quantity of air consequently enclosed? Threw a cover of a foot's thickness of litter (cut from the edges of the heap) over the top, to arrest and save the vapor. By thus cutting into the sides, it was found that fermentation was going on throughout. At different places, from five to seven feet within the first circumference, and from eighteen to twenty-four inches from the earth, the following various degrees of temperature were exhibited—60°, 65°, 85°, 76°, 91°, and 94°. The greatest heat of the sides was generally near the bottom. On the 22d, again covered the top with a coat of cold litter from the sides, as vapor was pouring out in greater quantity than before. Where most issued, a hole was opened for the thermometer to the depth of two feet and the heat found to be 148°, the highest yet known. Another place from which less issued was only 76°. The weather warm then, and for several days previous.

This day the first vapor was seen to rise from the mule pen heap, (No. 2.) On Jan. 24th, a heavy rain, which however did not make the litter of the farm-yard wet enough; but as no better state could be expected soon, we proceeded to heap

it around the first part of No. 3. The heat of this on opening the top, was found by my overseer too hot to be borne by his hand at the depth of eighteen inches, and the top was then covered over with three inches of earth, which had not been done earlier, from the fear of its preventing fermentation in so poor a mass. This served to stop the visible escape of vapor, though not to check the fermentation too much, (if at all,) as I found it on the 28th, at eighteen inches below the earth, to be 102°—and in another place, 90°. The heaping was stopped on the 28th, about one fourth of the yard being still left. On this, where the litter was thickest, (about twenty inches,) it was fermenting as it lay, and vapor rose from it as it was dug into for heaping. Its temperature in different places, was 80°, 70°, 89°. The fermentation however was very unequal: some spots were fire-fanged, and others still dry and unchanged. The heap (built around the first work,) was raised generally to six and a half or seven feet, on a circular base, twenty two yards across. The heap was fenced in, and fresh litter thrown over the uncovered part of the yard. Earth three inches thick was thrown over only a small part of the top to try the effect. The first of the latest heaping was already smoking (on the 28th,) in some places, and there the heat was found to be 90°.

30th. A steady slow rain nearly through the day. The out-spreading edges of No. 3 cut down and thrown upon the top. The weather generally warm latterly.

31st. The rain had served to lessen greatly the issuing of vapor from the heap No. 3. Proceeded to add the balance left on the yard to the same heap raising the part now thrown up to eight feet high. The oldest central part had shown no vapor since being covered with earth, (on the 25th,) but on running a pole perpendicularly through the crust, and about eighteen inches lower, the heat was found to be 134°. In a part of the latter heaping (of the 25th,) where most vapor issued, it was 105°—and where none was visible, only 66°. Slowly raining again.

February 1st. Finished heaping all the old litter to No. 3, which then occupied so large a portion of the yard, that there was not enough room left for the cattle, though they were still confined to the surrounding space. The heap was thirty yards across the base, and seven and a half feet high when first bulit. Earth was thrown over the greater part of the top, (where not done before,) but very irregularly, as the laborers could not see how to aim the casts from their shovels. Much increase of vapor before this operation.

2d. Found that the covering of earth was generally too thin. Though no vapor was visible (at 9 o'clock A. M.) the loss of effluvia was evident by the earth being thawed and moist, and the surface of the lumps being colored brownish, as if they had been soaked in the drainings from a dung heap. This was on earth dug and thrown on only twenty-four hours before. This appearance is enough to prove that more loss would take place without the covering of earth being used to arrest it. This deposit of solid matter is not found below, nor within the cover of earth, but on its new surface—and as much on the clods, as on the pulverized parts: therefore, it must first pass through, and then (on meeting cold air and being condensed,) is percipitated on the earth, and probably fixed there by some chemical power. Where the earth had been laid on more thickly, it was generally slightly frozen, and the escape of vapor was limited to different spots where there was either no cover of earth, or where the materials below the cover were very coarse and open. More earth was thrown on all such places that could be reached, and the remainder that were too distant from the ouside to be covered, were trodden, to make the surface more close.

The yard was again well covered with new litter. Two pigs were brought to the yard to get their living out of the grain left in the straw, and to mix the rich with the poor materials, by rooting about and separating the dung. This step was suggested by the appearance of the last heaped litter; and I believe that if such *laborers* had been employed from the beginning, the deep litter would (in time) have been sufficiently and equally rotted, without heaping, and no fire-fanging would have been produced. If such would be the case, heaping is unnecessary, except to hasten the fermentation of the manure for early use.

The stable pen heap [No. 2,] had thrown out no visible vapor, except on parts of two days, and then but little. On January 31st, the second of two very warm days, many plants sprung up on the top of this heap, from grain left from the food of the horses, and the seeds of weeds in the litter. As the heat is never sufficient to kill seeds in the outer six inches of a manure heap, and it is also generally too dry there for them to sprout, (at the usual time of heaping in the spring,) it is not surprising that so much *cheat* and *spelt*, always spring upon manured land, when those weeds were plenty in the crop of wheat from which the straw for litter had been obtained. The same warm day first brought up the oats on the flat top of No. 1, they having before sprouted only on the sloping sides, where the cover of earth was thinner.

February 3d. Vapor was still issuing generally from No. 3, and conveying enriching matter, as appeared from the scent. The earth last thrown on had not served to cover all the surface. If I had foreseen that so much earth would have been wanting the labor of digging out the centre of the yard might have been saved, as a few years use in this way will lower it sufficiently.

9th. No escape of vapor visible for some days preceding, (at least as late as 9 o'clock A. M.) except on one spot which had not been covered. But many places show by the brown color, and sometimes by the moisture of the covering earth, that something is, or has been lately passing through. In warm weather, the steam is not made visible by condensation, and therefore its escape is less easy to detect. The temperature of different places one foot and a half below the top, was as follows: 112°, 96°, 73°, 155°, 98°, 90°, 150°, 98°, 113°. The last named was the temperature of the oldest central part, and the preceding number (98°) shows the heat of a part of the new heaping, which on Feb. 2d, had been well covered with earth, and pressed close by being trampled on. The hottest places were found where most effluvia appeared to have escaped—and where least warm, there was no mark of such loss. The average temperature of the whole would have been much lower than of these numbers—probably between 90° and 100°.

Carted away for use the balance of No. 1. The interior of the bulk seemed no more rotted than

it had been two weeks before, though it was still warm. The heat had entirely subsided in all parts near the surface, and in some cases, as far as two feet inward. The temperature in different places was found to be 76°, 77°, 88°, 82°, 88°, and 94°—the two last being in the part least rotted. The cold part of the heap was as much reduced as I supposed desirable.

Began to carry out No. 2. This heap was still the wettest, and showed mouldiness in only a few spots. Its general temperature was low, and it was less rotted than No. 1, though the fermentation was still in progress. The hottest places found were 96° and 94°—elsewhere 80°. These measurements were made at two and a half feet within the bulk. Nearer the surface the heat became less. This heap, though much the richest, and not protected by any covering of earth, had passed through a more gentle fermentation, and seemed to have sustained less loss than either of the others.

March 2d. Dug into No. 3 for examination.—The heat much abated, and much damage found from fire-fanging.

8th. Had been some days carting manure from No. 3 to the field intended for corn, and spreading and ploughing it in. The heap had sunk to about four feet: but much the greater part of its loss of height (as in all other cases of dunghills lightly heaped,) was from the mere subsidence and compression of the materials. The upper half seemed enough reduced by fermentation, (or was in a more than half rotten state,) but the lower part was not much changed. Fire-fanged places were frequent, and most so where the manure was best rotted.—An empty barrel, open at both ends, had been set on the yard, and covered over by the oldest part of this heap, to try what effect would be produced by that bulk of air surrounded and enclosed by the fermenting manure. The barrel was reached this day, and the surrounding manure was found to be somewhat better rotted, and having more fire-fanged spots, than elsewhere. My thermometer having been broken, prevented any observations of temperature. In the first week of March, a large part of this heap had been moved to a distant part of the field, and there heaped again about six feet high. The earth was then too wet for the manure to be distributed over the field, and this moving and second heaping was done to lighten the future labor of carting, and also to try the effect of a second fermentation being excited. It recommenced, but very slowly; vapor did not show generally over the heap until the 18th of March, when a thin sprinkling of earth was thrown over part of the top. The vapor was still visible on the 28th, when the weather was very cold.

It should have been stated that the cattle were confined generally through the day to the pen, (except when driven to water,) during the depth of winter. After the clover began to spring, they were allowed to pick a little of it every day, and about the 20th of March, all were moved to another pen more convenient to their pasture. It was evident that their litter given since February 1st, was too dry and too poor of itself, and too little mixed with animal matter, to be fitted for spring use by heaping.

May 4th. Carting on the corn land (just ahead of the first horse-hoeing of the young plants,) the manure drawn from No. 3, and heaped a second time. It was still quite warm, between 110° and 120°, as was supposed from the touch—and more rotten and better reduced than any of the other heaps—the lower half less rotted than the upper. Not much fire-fanging perceptible—though something of it seen in every part. The portion that had been slightly covered with earth was least rotted, but the difference was inconsiderable. Vapor still poured out where the heap was opened, and was the more easily observed as the weather was cold and damp.

No. 1—The ox-pen manure made 165 mule loads.
No. 2—The stable-pen — — 234 — —
No. 3—The cow-pen — — 1365 — —
The last quantity includes that heaped a second time in the field, 344 loads.

From all the observations which have been detailed, (I fear at tiresome length,) and from all the errors committed, I think the following inferences may be relied on.

1. The greatest error was not making the manure of No. 3 wet enough. This deficiency might have been easily prevented by turning streams of rain water into the yard. The wetter the heap, provided it does not stand in a pool of water, the more gentle, regular, and the less wasteful will be the fermentation.

2. The heaps in every case were made too high, and the fermentation of the lower part of the mass retarded or prevented by the compression caused by the weight of the upper part.

3. The want of sufficient moisture instead of preventing fermentation, makes it more rapid and violent—and with sufficient access of air, produces fire-fanging, which destroys much of the value of manure so affected. The richer manures (as stable litter alone) are most liable to this disaster: but the very wet rich manure (No. 2,) heaped in cold weather suffered but little, and much less than the very poor but drier and more open heap, No. 3.

4. Manure will ferment in our coldest weather, and therefore we lose time by waiting for the beginning of spring to construct our heaps, and cause damage by the increased violence of fermentation.

5. We need not fear, by using the greatest quantity of vegetable matter to make our manure too poor to ferment properly and in good time.

6. If enough water had been introduced previously, No. 3 might have been heaped by January 1st—and the second littering also before the winter was over.

7. The fermentation of all the heaps would have been more complete, and probably without farther waste, if they had been left undisturbed until just before planting corn. But this was one of the many cases in which convenience directed more than reasoning. If the carrying out had been delayed until the manures were in the best state for use, the occurrence of wet weather and the pressure of other farm labors, might have prevented the application being made early enough for the crop of corn.

The weather through the winter was generally milder than usual, but there were three short excessively cold spells. The last of these was after the beginning of planting corn, and on the morning of March 30, the earth was too hard frozen to plough.

The effects on manures of the important and mysterious process of fermentation, will never be understood until chemists shall undertake the in-

vestigation—and not in the study and laboratory altogether, but also in stables and amidst dunghills. I fear that we shall never see one make the attempt in any way—though the investigation offers and promises results that would be most honorable to the discoverer, and of incalculable value to agriculture, and indeed to the human race. Chemists neglect agricultural investigations, and seem to consider them as unworthy of scientific research. Yet, if a discovery was announced of some new metal, or new acid, found so rarely and in such small quantities, that the whole globe would never furnish a pound together, and of which no man could conceive any possible use—every chemist would feel interested in the subject, and more would be done for its investigation than agriculture has ever owed to their whole body.

J. B.

ON THE CULTIVATION AND WASTE LANDS, AND SOME ACCOUNT OF THE PAUPER COLONIES OF HOLLAND.

From the Quarterly Review.

Amidst the party violence necessarily attending the unsettled state of the great question which renders Ireland the weakness instead of the strength of the empire, we are more than ever bound to turn our thoughts to those measures for ameliorating the condition of her people, which wise and benevolent men from time to time propose. We wish to avoid emigration; and had much rather do something at home—something that shall keep the people and make them useful.

The experiment of cultivation at home has been tried, and tried with very great success by the Dutch—a people who have always been famed for their prudence, the judicious way in which they conducted their internal management, and the care that they have taken of their poor. There are at present lying before us, three separate accounts of the "Pauper Colonies of Holland"—which are established upon lands naturally far worse than the average of the five millions of acres in Ireland. One of these accounts is in a volume by Mr. Sadler, entitled "Ireland, its Evils, and their Remedies;" another is by a member of "the Highland Society of Scotland;" and the third is by Mr. Jacob, the well-known reporter on the corn trade. Without meaning to throw any doubt upon the others, we shall abridge what we have to say from Mr. Jacob, because he gives his name, and because his account is shorter, and in our opinion, clearer than any of the others.

Mr. Jacob's observations have been published by "the society for improving the condition of the lower order of tenantry, and of the laboring population of Ireland;" and though the committee of that society have not yet published their report, or even matured their plan, it is probable that they may suggest, if not attempt, something similar to what has been effected in Holland.

In the observation prefatory to the account of the Dutch colonies, Mr. Jacob very successfully combats the objections that are usually made to the improvement of the poorer soils, both from general principles, and from practical cases.

Of late there have sprung up some very inveterate prejudices upon this subject. They mainly originated with the late Mr. Ricardo. But he looked only at the money value, the artificial value, of things; and was not aware of that natural value which costs society nothing. Adam Smith set down the "land and labor" as the primary sources of wealth; the moderns threw out the land altogether, and confined the value to the labor. Among other false conclusions to which this led them, was the doctrine that the cultivation of certain lands—that is, of lands that will not yield a certain return for the labor, and not bestowed upon them, is a loss, not comparatively, as measured by the other occupations in which they who cultivate the land might be employed, but absolutely and in itself. Now *if people can do better* it is not prudent for them to cultivate bad land, or even good land, or in fact to do any thing but that which is better; but *if they can do no better*, then the ploughing of the most arid waste in the kingdom, or even the scratching of it with their hands, if it will thereby yield them any produce, is not only advisable, but absolutely necessary. Some portions of almost every country, and some whole countries that are now the most productive and profitable, were at one time complete deserts. In spite of the rights of commonage, and the bad effect of tithes, there are many acres of this description in England; there are many more in Scotland; and the whole of Holland, and much of the north of Germany and the peninsula of Jutland, were originally barren sands, and have been brought to their present state by repeated cultivation, the first efforts of which were what these persons would have called unproductive. If there be any vegetable mould, however poor; if there be any stony matter in a state of division like sand; if there even be the bare rock as a flooring to lay soil upon—that is one element of fertility and production that costs nothing. One of the finest crops of potatoes, both as to quantity and quality, that ever we saw, was beside the huts of some fishermen on the coast of Loch Ailsh, on the west coast of Ross-shire; they had been planted on the bare rock, and merely supplied with two layers of turf from a bog at some distance, one below the seed-sets, another over. The air is another important element of fertility—so very important that not one of the vegetable functions can be performed without it; and the air costs nothing. The rain and the dew, even the snow of winter, and the frost that pulverizes the clods, are all elements of fertility; and they cost nothing. So also is the genial influence of the sun. In fact, if there be but room and climate, (and the latter may be wonderfully improved by cultivation,) we are in possession of all the essential natural elements of plenty, and human industry can supply the rest.

Cultivation by cottagers has been very successfully employed in many parts of Scotland, not for the mere support of a local population, but with a view of bringing a large surplus ultimately into the market. In some places, where the moor or waste is of superior quality, and the climate good, the cottagers pay a rent from the beginning of their operations: and, in some places, they are allowed something annually to commence with, and are bound to bring so much soil into cultivation every year, till, at the expiration of a stipulated time, they pay rent. In one place in the north, this mode of cultivation was begun many years ago close by the shore; and the cottages have moved gradually up the hill, leaving land behind them fit for being converted into large farms, while they

have not only submitted to the removals, but considered them as advantageous. The same system has been tried in Ireland, among others by Lord Palmerston, at the suggestion of Mr. Nimmo, the engineer; and, as far as we have been able to learn, the success has been complete. But we have somewhat digressed from our main subject.

Of the Pauper Colonies, the one which Mr. Jacob selects for illustration is that of Frederick's Oord. The originator of the scheme was General Van den Bosch. The general, while in the island of Java, had formed a connexion with a Chinese mandarin, whose skill in farming he had admired, and who had under him a colony of emigrant Chinese. This connexion turned out so well, that the general, on his return to Europe, was able to sell his estate for six times the original cost. Though the plan which the mandarin and his colony of emigrants adopted in cultivating the Javanese estate be not mentioned, it is by no means improbable, that it was the same with that adopted in the Netherlands—only allowing for the difference of climate and produce; as General Van den Bosch could not cultivate his own estate in Java to so much profit, till he entered into the arrangement with Tjan-hoeck, the mandarin. In justice, therefore, we ought to consider the plan as originally a Chinese, and not a Dutch one, though the Dutch have the merit of introducing it into Europe. General Van den Bosch laid before the king of the Netherlands a plan for a pauper establishment, which at once met with the royal patronage. A public meeting was held at the Hague in 1818, and a society of beneficence formed, and two committees organized for its management. The first, or committee of beneficence, consisted of twelve members—or a president, two assistants or assessors, and nine members, one of whom acts as secretary. The president was appointed for life, the assessors annually, but capable of being re-elected: and the president was Prince Frederick, the second son of the king. The members from four sub-committees: finance, instruction, correspondence, and general purposes; the first and second having each an assessor for chairman, and the others choosing their own.

The second committee, or committee of superintendence, consists of twenty-four members, who elect their own president and secretary. This committee examines and audits the accounts, watches the expenditure and operations of the society, and directs the prosecution of those who do not conform to its regulations.

Having received the sanction of the king, the society was recommended to all the local authorities, and soon found itself in possession of £5380, obtained from more than 20,000 members. Having obtained funds, and made the necessary arrangements, the society purchased the estate of Westerbech Sloot, on the east side of the Zuider Zee, and not far from the town of Steenwyk. This estate cost them £4660; and it contained from 1200 to 1300 acres, about 200 of which was under a sort of culture, or covered with bad wood, and the rest a mere heath. They let the cultivated land, about one-tenth of the whole; deepened the Aa, (which runs through the estate,) so that it is navigable for boats, and built store-houses, a school, and dwellings for about fifty-two families, of from six to eight persons each. There operations were begun in September, 1818; by the 10th of November the houses were ready; and the communes sent some poor families.

The total expenses of each family, in sterling money, was as follows:—

	£.	s.	d.
Building each house, - - -	41	13	4
Furniture and implements, - -	8	6	8
Clothing, - - - - -	12	10	0
Two cows, or one cow and ten sheep,	12	10	0
Cultivation and seed, first year, -	93	6	8
Advances in provisions, - -	4	3	4
Advances of other kinds, - -	4	3	4
Flax and wool to be spun, - -	16	13	4
Seven acres uncultivated land, net,	8	6	8
Total establishment,	£141	13	4

This estimate is between £22 and £23 for each individual, and they are expected to repay it to the society in rent and labor, besides maintaining themselves, in about sixteen years. Each allotment of seven acres is laid out in a rectangle, having the house toward the road with one end, and the other reaching fifty feet into the allotment. The dwelling occupies the part next the road, then comes the barn, after that, the stalls for the cattle, and behind these, the reservoir for manure, in which every particle of vegetable and animal refuse is carefully made into compost, with the heath and moss of the land; the preparation of this compost being one of the most essential of their labors. While under the society, they are subjected to a kind of military regulation, all their work being done by the piece; they assemble at six in the morning in summer, and, even in winter, and those who do not answer to their names at the roll-call, get no wages for the day. When the labor of the day is over, each receives a ticket stating the amount of wages; and for that he may procure food from the store at fixed rates. Those who are at first unable to support themselves get credit, but they must pay afterwards. The women spin, weave, and knit, at first from purchased wool and flax, but as soon as possible from the produce of their own flock and fields. A day and a half's work every week is allowed for the support of the sick, the infirm, and those who are not fit for labor; and for this those who work are allowed one shilling per day in summer, and eightpence in winter. The whole of the necessaries and appointments are regularly inspected with military care, and such as have been wasteful are obliged to make good what they have destroyed. It will be borne in mind that the whole stock out of which each family of seven or eight persons is to find support, and if they can, effect some savings, is the stock of £141 13s. 4*d.*, and the seven acres of waste land—not only waste land, but land which is of a description not the most susceptible of cultivation. The careful preparation of manure, the most remarkable feature in Chinese husbandry, is the grand resource; and the result is far from discouraging. We shall not give the details; but the following are the sums of produce and expenditure for one year:—

Total produce - - - - - - - -	£47	15	0
Expenses, including rent, [about 12s. an acre] - - - - - - -	39	11	8
Surplus each year - - - - -	£8	3	4

The desire of gain and the approbation of the superintendents, are, in general, found to be suffi-

cient stimuli both to industry and good conduct. When these are not enough, forfeiture of privileges, confinement, and hard labor are resorted to. There are also badges of honour—medals of copper, silver and gold. Those who have the copper medal may leave the colony on Sundays without asking leave; the silver is given to those who have made some savings, and they are allowed to go beyond the colony in the intervals of labor on working days; and when they are entitled to the gold medal, by having shown that they clear £20 16s. 8*d*. a year by their labor, they are free tenants, and released from all the regulations of the colony. These privileges may, however, be suspended for offences.

In the course of seven years, from its first establishment, the colony of Frederick's Oord contained a population of 6778, including that of Omme Schanze, under a more rigid control, and among the number were 2174 orphans and foundlings. The total number forming all the colonies in Holland were stated to Mr. Jacob at 20,000, but he thinks it exaggerated; there were, however, 8000 in North Holland. Every attention is paid to the education of the young; and, in a country which has been always remarkable for its good sense in matters of religious opinion, and which, like Ireland, is, now that Flanders has been added to Holland, made up of Catholics and Protestants, it has, as Mr. Jacob remarks, "*been deemed wise to keep education apart from spiritual tuition*"—a wisdom which, if ever Ireland shall be blessed by the establishment of similar colonies, could not be too implicitly followed.

And there are five millions of acres in Ireland, each of which is just as capable of supporting its human beings, and in sixteen years repaying the expense of putting them there, as those upon the wilderness of sand, peat, and heather, at Frederick's Oord in Holland. Indeed they are a great deal more so; for very many of the Irish acres are of a quality capable of yielding a good crop without any previous manure; and few or none of them need be devoted to so poor a grain-crop as rye—the only one which the Dutch colonists appear yet to have cultivated to advantage. Ireland, too, has greatly the superiority in climate—in every natural advantage. And there can be no doubt that the laboring Irish would work hard enough if they were once put under proper regulation.

Here then are means of relief at hand, sufficiently ample to employ the whole of what is very improperly called the surplus population of Ireland, (there can be no surplus population where there are five million acres, out of about twenty that might be cultivated, but are not;) and this is a relief which does not rest upon theory, but of which we have as clear a practical demonstration as can be obtained on any subject.

Nor need the advantage be confined to Ireland. There are, according to the statement already quoted, four millions of acres in England and Wales, that might be cultivated to advantage, and six millions of the same description in Scotland; so that, in the whole island of Britain, there are ten millions of available acres, and fifteen millions in the entire kingdom. With this fact on the one hand, and the successful experiment of the Dutch on the other, we speak, and write, and legislate about an excessive population, and send the people all over the world, at double the expense which, in colonies similar to those of Holland, would make them independent at home.

The people of Scotland might be, perhaps, left to manage matters as they please, because there, so far as we know, the able-bodied have not yet sent in a formal claim for charity. But really if there were such colonies in England, the advantages would be immense, both in saving to the public and in preserving the habits of the working classes. The amount of the poor-rate might then be diminished by more than one-half; and all the advantages of it might be secured without any of the evils. If those who were able to work and could not find employment were sent to the colony the parish would be relieved of the burden of all save the really necessitous; and the probability is that the number who cannot now find work would thereby be greatly diminished; the large sums now annually spent in litigation, or in wheeling and countermarching paupers over the country, would be entirely saved, as the parties who are passed to their parishes are generally able to work, and could be sent to the colony without any expense.

Even culprits might be employed at a profit to the public, as the delinquents are in many of the Dutch establishments, instead of idly treading the winds as they are now made to do at our treadmills. On the subject of labor, some of our countrymen appear to have the most singular notions that ever entered into human heads. If we do not actually believe that men live upon labor and not upon food, we act as if that were our belief—which comes nearly to the same thing: That we may not injure the honest laborer, we direct that the labor of those whom we sentence to it as a punishment shall be of no profit; and we take the price of their maintenance and of the machinery that they waste in their idle drudgery out of the pockets of those who do labor; whereas, if we made the culprits do any thing useful, the whole that they did would be, as compared with our system, a clear gain.

If we had such colonies as a resource to meet the contingences of those who were able to work, and our poor-rate freed from the customary litigation and jobbing, our system of provision for the helpless and the unfortunate would be very nearly perfect; and if we could bring about both for Ireland, we should do more for her than if we were to spend a thousand years in political legislation. We hope that the society, to which we have alluded, will go on vigorously; they who would in any way thwart or retard their progress are not the friends either of Ireland or of England.

ON HEDGES; BY DR. JOSEPH JOHNSON.

Read before the Horticultural Society, May, 8, 1833.

I beg leave to offer a few observations on hedges, or live fences.

The scarcity and cost of good materials for timber fences, has led to the practice of commencing inclosures with a ditch and bank. This practice, however proper for economy, and the preservation of the wood, is the worst that can be for the propagation of live fences. The ditch drains the adjacent earth, so as to exhaust all the moisture requisite for the nourishment and growth of the tender young cuttings or sets; and the bank, instead of supporting, impoverishes them. The chief cause of protracted growth—of difficulty and disappoint-

ment in all hedges—in all countries, is the ditch and bank.

The next great difficulty arises from the grass and weeds, which are suffered to grow with the young plants, and of course to exhaust the sustenance, more essential, at this time, to their growth; because of their having, as yet, but few and feeble roots for their support.

1st. It is therefore recommended to commence the planting of a live fence in October or November, when the grass ceasing to grow, would not injure the young plants for the first six or seven months.

2d. That every such hedge, should be sheltered by a fence or inclosure for three years, until the plants shall have acquired strength to support themselves, and bear the injury usual from cattle.

3d. That the ground be well prepared by ploughing or hoeing, a space at least four feet wide.

4th. That the plants or cuttings be set out from six to eight inches apart, in two rows, distant from each other about two feet. If seeds be sown, they should be nearer to each other in each trench, to allow for failures.

5th. That the weeds and grass be carefully kept down for two years, by some one no longer valuable for field labor, working with a light narrow hoe.

6th. That all hedges be plashed or wattled as soon as the plants are about five feet high.

7th. That no tree of any description, be suffered to grow within thirty feet of any hedge.

The practical advantages of fencing with the non-descript or Cherokee-rose, have been forcibly presented to the public, by the late Mr. Stephen Elliott, and Mr. R. E. Rowand. If a hedge be made of this, it will require to be trimmed freely with hooks, to prevent it from growing so thick, as to afford shelter for rabbits, rats, &c.

But I would suggest the use of other plants for hedges, some of which may be found worthy of attention, in different situations and circumstances. The daily rose (*Rosa Canina*) is very easily propagated by cuttings, layers and seeds. It is a hardy, vigorous plant, and in two or three years acquires sufficient height and strength to be useful, especially if plashed as all hedges should be. It is preferable to the Cherokee-rose, in this respect, that while it acquires a sufficient growth as early, it never grows beyond what is necessary, nor imposes the expense or trouble of frequent dressings. For ornament, it is, at least, equal to the other.

The Pomegranate is very easily propagated from cuttings or suckers at all seasons of the year. I do not know any plant which takes root with more certainty. The wood is tough and durable, grows promptly to a sufficient height and never exceeds what is proper.

The Oranges, either sour or sweet, when sowed in trenches, would acquire sufficient growth in two or three years, and no animal would be so daring, as to attempt a passage through its impenetrable barrier. In this way it would bear the frost much better, than in detached stems, and would not grow either so high or so large as when more open and widely spread. It would probably be found in the southern states, as useful as the well-known Lime-hedges of the West Indies. The seeds of the Sweet Orange, may be obtained in great abundance from the decayed oranges, at the fruit shops.

The Burning Bush, (*Pyracanthus*). For this suggestion, I am indebted to my friend Mr. James Nicholson, who has already set out a hedge of this beautiful plant, with the most favorable prospects of success. It is not only ornamental, but bushy and thorny, not exceeding the proper height for a hedge, and can scarcely fail of being valuable.

The Cassina, (*Ilex Cassina*) if not too familiar, would be highly prized for its beauty and durability, as an evergreen hedge. When once plashed, it would not require to be repaired or trimmed for many years, if ever. To please the eye and give it the uniformity of level and surface, expected near a residence, it may be occasionally drest, but not of necessity.

The Slow or Black Haw, (*Viburnum Prunifolium*) one of the prettiest of our many native shrubs, and one of the first to unfold its beauties in the spring, may be propagated from the seeds, or from suckers and layers, or by transplanting from the woods.

The Haw Thorn, (*Cratægus Parvifolium*) which is found in such abundance in all our old fields and commons, may be transplanted or raised from seed. It is slow in its growth, but not so slow as the Black Thorn of Europe. It is equally certain and effectual in forming a quick-set hedge.

The Crab Apple, (*Pyrus Coronaria*) is one of the most fragrant and ornamental of plants; its growth is slow, after having acquired the ordinary height of a fence, and it may be propagated with great ease from seed. It may likewise be transplanted, but is said to require much care and attention to preserve it.

On the subject of transplanting, suffer me to digress, for the purpose of reminding some and suggesting to others, that the success of this process may be greatly promoted, and rendered almost certain, by dividing the long horizontal roots of every plant or tree, that you wish to remove, at least a month or two before you contemplate such removal; and, if possible, while the plant is still vigorous in its summer foliage. The object of this early digging round the plant, is to give the opportunity and impose the necessity, for it to throw out numerous fibrous absorbing roots, to supply the nourishment, of which it had been deprived, by destroying the horrizontal roots. While the tree remains in its native position, this can be readily done in a month or two, but without this precautionary measure, it is exposed to death, before it can obtain sufficient nourishment by means of new roots. Again, I would recommend that leaves, pine-trash, or moss, be thrown round the roots of plants newly set out, for the purpose of preserving an equal temperature, protecting them from the exhausting, scorching influence of the sun, preventing the growth of grass and weeds, and retaining moisture about the roots.

A difficulty may be supposed to exist, in making an entire inclosure, by the impossibility of propagating highland plants, where the fence should pass through a piece of low ground. Shall the hedge be interrupted in such situations, where of all others, the rail or common fence decays most rapidly! I think that it need not be interrupted by such a circumstance. I am confident that native plants may be found, well adapted to fencing in such situations. I suggest that the Hazel or Pond Spice, (*Laurus Geniculata*) may be trans-

planted from ponds, and become a permanent fence. The willow is always at hand in such situations, and there can be no doubt of its success. The Wild Rose, (*Rosa Corymbosa*) and Bramble, (*Rubus Villosus*) may be transplanted, separately, or together, on a bank run in the line of fence, and soon become impenetrable. The Tamarisk, which has a wonderful facility in adapting itself to all descriptions of soils, may be tried, particularly where such grounds are occasionally overflowed by salt-water, and where the line of fence may terminate at some creek or other stream of salt-water. The China-Briar, (*Smilax Chinæ*) and Green Brier, (*Smilax Peduncularis*) the Suple Jack, (*Zyzyphus Volumbilis*) the Cross Vine, (*Bignonia Crucigera*) and the other vines which grow luxuriantly in swampy places, may be transplanted with ease. The Whortle Berry, (*Vaccin, Staminos'm*, and *Frondos'm*,) the *Aster Caroliniana*, the *Kalmias*, *Andromedas*, *Rhododendrons*, and *Azalias*, may contribute to extend and adorn the inclosure. The Farkle Berry, (*Vaccin'm Arboreum*) may be planted and transplanted in fencing through a piece of pine barren, where it might be difficult to succeed in propagating other shrubs.

It may be expected that I should offer an opinion as to the relative advantages of these plants for hedging. I acknowledge that I have not sufficient experience to decide any such question. If a garden is to be hedged, I might prefer the Burning Bush and Daily Rose. If a lane near my house, I probably would set out Crab Apples and Pomegranates alternately, twenty or thirty feet apart, and fill the intermediate spaces with evergreens, such as the Cassina, Holly, Orange, Olive and Arbor Vitæ.* If an avenue be wanted on an inclosure for a farm, I might prefer the Slow and Haws, with intermediate tufts of Cherokee-rose, Tamarisk, Crab Apple, or other ornamental plants. But such selections will be directed by the greater taste and experience of different persons, or by the greater facilities enjoyed for obtaining either or all, of the different kinds of plants. If a permanent fence be wanted for a pasture or other inclosure, what can be wished for more speedy, more certain, more durable, and less troublesome, than the common Plum of the country? (*Prunus Umbellata*,) the Winter Plum, (*Prunus Hiemalis*,) and the Pig Plum, (*Prunus Chicasa*,) may be likewise used. A mixture of the three may be preferable to the use of either singly, as they blossom at different seasons of the year, and thus render the hedge more ornamental. They need not ever to be trimmed or dressed. Let them only be plashed, and the work is done. The fence will be impenetrable and almost everlasting.

The mode of plashing a hedge, being probably unknown to many of the Society, I herewith present both a drawing and a model; hoping thereby not only to be better understood in my endeavor to describe it, but that a stronger impression of its facility and advantage, may thereby be made on the minds of the members. Plashing is done, by preserving in an upright position, every fourth plant, in the line of your hedge, and bending the intermediate plants to an angle of forty-five degrees, by means of a slight notch near the earth, so as to be wattled and interlocked with at least two of the upright plants. The tops are then attached by a thread, vine, or piece of bark, to the top of each upright plant, until the growth of branches interlocking each other, renders the intertie unnecessary. In the Orange, Rose, and Thorn, it is probably unnecessary to secure the tops to each other. If in its proper place, the upright plant be too small or otherwise defective, a stake of cedar or other durable wood, may be used in addition to and in support of the young plants. The notch or incision near the root of the bending plant, does not injure its growth, but generally causes a growth of suckers from the part, which thickens and improves the hedge. When the stems or trunks grow too stout, or when it becomes requisite to increase the mass or bulk of the hedge, it can be done, by cutting the trunk half through near the root: an abundant growth of suckers will ensue, and if necessary, the trunk may then be removed altogether. Plashing has unfortunately been spoken of by writers on this subject, as applicable only to old and decayed hedges, and even then with doubts of its advantages. I think that these doubts arise altogether from delaying to plash until the hedge is decayed, in which situation all expedients would be at least doubtful in restoring its strength. But if practised when the plant has acquired its proper height and strength, there can be no doubt of the benefits.

The want of fencing materials on some of the most valuable plantations in the State, has become a serious evil within the last thirty years. The very general destruction of the long leaf Pitch Pine, (*Pinus Palustris*) about that time by insects, has left the planters, near the seacoast, under great difficulty in keeping their inclosures secure from year to year. The Loblolly Pine, (*Pinus Toeda*) decays so rapidly, that it is scarcely worth the trouble of splitting and carting.

If any of these suggestions should be deemed worthy of attention by gentlemen owning property in this or any other Southern State, the result of their experience is respectfully requested for the benefit of all. I should feel as much pleased in finding my speculations corrected by the judicious experiments of practical men, as in hearing that they had been tried and approved.

* I have lately heard that Mr. J. Lucas and Mr. Thomas Bennett have perfected beautiful evergreen hedges of the Arbor Vitæ—and adopt the idea from their experiment: I have since also learned that Mr. Landreth, of Philadelphia, had such a hedge three years old in the year 1831.

HUNTING BEES.

The manner of hunting bees, as practised in the new settlements, may be familiar to many of the readers of the Genesee Farmer, but perhaps not to all. As advantage is taken of a peculiar instinct, it would, I think, be interesting to those unacquainted with it, to be informed of the process.

A tin box is provided, capable of containing about a pint. Into this is put a piece of dry honey comb; a bottle of honey and water, mixed about half and half, is also provided. The honey is diluted, in order that it may be more readily poured into the dry comb—that the bees may not be so liable to get it upon their wings, and will be able to fill themselves the more expeditiously. Apparatus for making a fire may also be necessary. With these, the hunter proceeds to a newly cleared field, at a distance from any hive of domestic bees, and having poured a little of the composition into

the comb, he proceeds to search among the wild flowers for a bee. If one can be found, he is caught in the box by shutting the lid over him. As soon as he becomes still, the lid is carefully removed, when he will be found busily filling himself with honey. When he rises he must be watched, in order to ascertain his course. After making one or two circuits about the box, he will fly off in a straight course to his home. After an absence of a few minutes, say five or ten, he will return, *bringing with him two or three of his companions.* These will soon fill themselves, go home, and return again with a number more. Thus they will continue to increase in number, till in the course of half an hour there will be one hundred or more in the box. By that time the line will be ascertained with precision. The lid is now shut over as many as possible, and the box is removed on the line to the edge of the woods, where it is again opened. The line will soon be found at the new station as before, and thus the box is removed, from station to station, until the tree is either discovered or passed. If the tree be passed, the line of course will be retrograde. A small pocket spy glass is a convenient thing for searching the tops of trees, as it requires a good eye to see a bee at that distance. If a bee cannot be found to commence operations with, a little honey is burnt on a stone, and if a wandering bee happens to be near, he will be attracted by the smell.

The proper time for hunting bees, is on a fair warm day in the month of September or October. During the summer months, when food for bees is to be found every where, they will not traverse. If a bee tree is in the neighborhood of a sugar camp, bees will be found about the tree in the time of making sugar. They will traverse well in the spring.—*Gen. Far.*

EXTRACT FROM THE RECORDS OF THE UNITED AGRICULTURAL SOCIETIES OF VIRGINIA.

[The following report has already been published, with other papers proceeding from the same association, in some of the early numbers of the American Farmer: but as they probably have not been seen by much the greater number of our readers, we now place this report before them, and recommend the subject to their consideration. The United Agricultural Societies have long since come to an end—(according to the custom of Virginia with every public spirited scheme which requires the persevering zeal and exertions of many individuals to sustain)—and we believe that no other such society now has an active existence, within the limits of the state, unless that of Fredericksburg forms an exception. But even if no new societies should rise, the reasoning and recommendations in this report may be serviceable to the readers of the Farmers' Register, to all of whom the observations on making and reporting experiments are as applicable, as if all were united in one great agricultural society.]

REPORT ON AGRICULTURAL PREMIUMS,

Submitted to and approved by the Delegation of the United Agricultural Societies of Virginia, Dec. 6th, 1822.

The committee instructed by the delegation "to "inquire into the subject of premiums for the im- "provement of agriculture, the advantages and "disadvantages which have been found to attend "them, and the course which may be deemed ex- "pedient for the delegation to pursue, for the pur- "pose of fulfilling that part of their duties as en- "joined by the constitution"—Report as follows:

It has been almost universally the plan of agricultural societies, to devote a large proportion of their funds to premiums for such practices as they considered improvements in agriculture. From the general concurrence in this course, it must be inferred, that such societies consider the premiums which they offer, as their best, if not their only means for promoting the improvement and extension of agricultural science. We venture to dissent from this received opinion, and though fully impressed with the benefits which might be derived from premiums judiciously bestowed, we feel satisfied that the usual practice is productive of but little good, and perhaps of more evil than good, to the objects which they were intended to promote.

Premiums can only be offered for practices of three kinds, viz:—1st. Those which are known to be profitable—2d. Those which are known to be unprofitable—and 3d. Practices of which the profits are doubtful or uncertain. It is so evident as to require no proof, that premiums of the first kind must always be useless. As general propositions, every farmer knows that it is most profitable to enrich his fields, to till them well, to use good utensils, and to keep his live stock in good condition. Yet want of capital, care, or industry causes many of them to continue in the opposite courses—to use insufficient or exhausting tillage, bad utensils and half starved teams. But as much as improvement in this respect is wanting, none could be produced by premiums. Profit is the farmer's great object, and if that itself does not improve his practice, nothing else can. If the reasonable expectation of doubling his crops has no effect in inducing him to adopt a better system, it is idle to expect any such exertion from the offer of a twenty dollar premium.

The greater number of premiums offered are of the second class, and are as clearly hurtful as the preceding are useless. A reference to the list of premiums offered by societies, will show that much the greater number are for practices which, so far from being practicable, would insure a loss to every one who gained or contended for them. Such are the premiums for the most productive acre of corn, wheat, rye, potatoes, &c. the finest (*i. e.* the fattest) ox, cow, sheep, hog, &c. To obtain these premiums, enormous crops have been raised on many single acres, and beasts have been brought to a degree of fatness, which no consideration of market price, or *net profit* would ever have induced, or will ever cause others to imitate. It is doubtful whether in China or Flanders, the best cultivated and most populous parts of the world, it can ever be profitable to bestow so much labor and manure, as to raise every acre to the maximum of production. In the United States, where land is so cheap and labor so high, the least reflection will show such a course to be folly in the extreme. The certain effects of these wonderful *improvements* in agriculture, prevent the example being followed, and fortunately, the loss is confined to the few who make a single effort merely to obtain a premium. He who succeeds best in a losing business, has not thereby benefited himself or his neighbors; and universal ruin would ensue, could the societies extend the practices which they thus recommend, to every acre, and all the fattened stock in the country.

The agricultural societies of the northern states stand foremost, both in activity and success in distributing premiums of this kind; and we are more particularly called on to notice them, because their example has more than once been held out to us for imitation. Several numbers on the "Northern Cattle Shows, &c." (which we believe were written by a gentleman who is certainly an able and zealous, though in this and some other things, a mistaken friend to agriculture,) were, for this purpose, published in the 2nd vol. of the American Farmer. In our own justification, therefore, it is necessary to show that we have not followed, because we do not approve the course thus recommended, and not because we are careless of the great objects of our association.

Though we freely object to the direction of these premiums, we admire and fully estimate the zeal which prompted them, in our sister societies of the north. We also readily acknowledge that their cattle shows and fairs were attended with collateral benefits, well worthy the attention of other societies. By thus instituting annual agricultural festivals, the societies were made more important, their meetings interesting, and therefore well attended, and many who were attracted only by parade and merriment, were drawn to the support of the zealous and sedate friends of agriculture. By these means, much activity and zeal were suddenly excited, which we should sincerely regret to see evaporated in producing a few fat beeves and rich acres, without being at all directed to the real improvement of agriculture. When the utter uselessness of such premiums is seen, as it soon must be, we fear that the zeal which they excited will subside, instead of being turned into a proper channel.

The recommendation by means of premiums, of practices, which in themselves are injudicious and unprofitable, is by no means confined to the societies of the northern states. We have seen no list of premiums in the southern states, entirely exempt from this fault. Even the British Board of agriculture is as liable to the charge as any association of inferior celebrity, as may be seen in the account of their last distribution of premiums. Nine bulls of the short horned breed were exhibited, and the premium for the finest was awarded to one weighing 2465 lbs. which was admitted to be "too fat to *serve*" in his vocation, or we presume for any other purpose, unless for the tallow chandler and soap boiler. An English newspaper, not long since, mentioned another society having conferred their gold medal on some person, who had planted the greatest number of acorns: yet if oaks were more profitable than grain or live stock, there is no doubt that a premium would not be required for the culture—and if not, the individual obtained a premium for planting the least profitable crop.

So far as premiums of the second class (or those for unprofitable practices) have influence on agriculture, their effects are injurious; and the best apology which can be made for them is, that their influence is extremely limited. That they cannot even indirectly produce the least benefit, is taught by reason, and confirmed by experience. Within the space of two years, in New York, $20,000 was furnished from the state treasury, in addition to the contributions of their numerous agricultural societies, and devoted to premiums. No where have they produced so many competitors, or greater exertions for success. Had the plan really tended to extend agricultural knowledge, we might have expected as fruits, from so many societies, a mass of agricultural papers. Yet we have lately seen published a circular letter from the board of agriculture, which draws together all the correspondence of the societies, requesting from private individuals such communications as may enable the board to print a volume. We mean to cast no reflection on the farmers who compose these societies; we doubt not their ability to have supplied the deficiency, which the circular letter admits to exist. We see too much of this deplorable inertness in our own members to be surprised at the same fault in others. Nor do we mention these facts in triumph, or with the view of affecting a superiority, to which, in this respect, we have no pretensions. We review the course of our respected fellow laborers to show, that all the stimulus afforded by their premiums has not at all advanced their knowledge of agriculture, nor in any way promoted its interest or improvement.

Though our opinions would tend greatly to limit the range of premiums, there still remain enough objects, for which they would be highly useful. All these will be found in what we have called the third class, *i. e.* practices, of which the actual or comparative profits are doubtful, or disputed; and which, therefore, are proper subjects for investigation by experiments. But premiums are as often thrown away on this class as on the other two. This must be the case, whenever a premium is given for obtaining some specified result, as for example, for the heaviest crop of woad or madder, instead of for making such experiments as would show the degree of profit, or loss, attending those new crops. Many of the premiums usually given are of this class, and courtesy requires that all should be considered as such, according to the opinions of the societies conferring them; for nothing could be more absurd than proposing premiums for practices, which they themselves knew to be unprofitable. Premiums may produce fine acres of wheat in Massachusetts, or of clover in Lower Virginia, and yet leave the profit or loss as uncertain as before.*

Accurate experiments on any doubtful points are always valuable to agriculturists in general, but in far the greater number of cases, cause loss to their conductor. Hence the particular propriety of encouraging experiments by premiums. An agricultural experimenter may, possibly, by some fortunate discovery, compensate himself for his previous losses; but such good fortune is rare, and most persons, who in this way have rendered signal services to farmers, have done so by great individual sacrifices. This great obstacle is not the only one which opposes the correct method of investigation, and the advancement of the science of agriculture. Notwithstanding the certain attendant loss, every zealous farmer is, to some extent, an experimenter. But the results of his experiments are not known except to himself, and even to him many appear useless, which if compared with those of others, would lead to important consequences.

* When this report was made, the use of calcareous manures was but little known in lower Virginia, and still less was their effect of making clover profitable on soils, which before were incapable of sustaining its most feeble existence.—*Ed. Far. Reg.*

To prove by experiment that a doubtful practice is wrong, would be as valuable to agriculture, as if the result should show that it is right: but on many such points, proof has perhaps been obtained fifty different times, by as many farmers having no communication with each other, and still the results may be unknown to all but the several experimenters. Premiums for experiments, conducted with care and accuracy, and repeated under different circumstances, until the point in question was clearly settled, could not fail greatly to promote the improvement of agriculture. The advantage derived would not be inconsiderable, even if such premiums had merely the effect of giving publicity to the numerous experiments which are made with other views, and which would otherwise never be known. But we can scarcely doubt that their number could be greatly increased, be directed to the most important objects, and conducted with far more care and attention, when, in addition to the hope of being honored with a premium, the experimenter would expect to profit by the labors of many others, engaged in similar researches.

Agriculture remains in the same situation in which formerly all sciences were, that required experiment for their proper investigation. From the time of Aristotle to that of Lord Bacon, philosophy made scarcely any progress. During this long period, every philosopher who reached celebrity, distinguished himself by producing some baseless hypothesis, which was received as true, until overthrown by one more plausible, but which was alike destined to yield in its turn. The profound Bacon first pointed out the tedious, but sure road to escape from this labyrinth of error, and Newton, by pursuing that course, and testing every proposition by experiment, was enabled to go farther than all his predecessors. Since then, the old mode of theorising has given way to actual experiment, in every branch of knowledge to which it was applicable, except agriculture, the most important of all; and it is therefore not surprising that agriculture has remained almost stationary, while other sciences have advanced with such rapidily, as scarcely to allow the world to mark their progress. Agriculturists alone continue to grope through theories, unfounded opinions and prejudices. Some one proposes a new theory or system of cultivation—every speculative farmer immediately becomes its advocate or opponent—volumes may be written for and against, and perhaps a century spent before it is decided whether the opinion was right or wrong. Such is the course we regularly pursue; and as in every contested point, one party must be wrong, and in consequence, pursue an unprofitable practice, the loss of money, labor and time may exceed a hundred times the cost of all the experiments necessary to remove the difficulty. They who lose most by this improper course, are always the last to see the want of a guide more sure than theory. Farmers are generally much too easy of belief; they take sides with the feelings of partisans, and whether they support an antiquated prejudice, or the wildest modern hypothesis, are equally sure that they are right. As examples of the chance for success in this method of searching for truth, in England, the merits of Tull's Drill system is scarcely yet settled, and the war between the Fallowists and the Anti-Fallowists, will probably continue another thirty years. The advocates for rotted and unrotted manure still contend in this country and in Europe, without appearing to approach a decision, and in this district we are as much divided in comparing the advantages of grazing and inclosing, natural and artificial grass, green and dry, for improving the soil, and in estimating the value of every other kind of manure within our reach. Yet the knowledge which we seek can only be attained through experiment; and all we now possess was derived from experiments, though mostly made by accident, and their results forced on our observation. To such chance discoveries, made at long intervals, and separated by errors and absurdities innumerable, we are indebted for almost every thing that deserves the name of agricultural knowledge.

When, in addition to the obstacles already mentioned, to experiments being made by separate individuals, urged only by zeal for research, we consider the time and labor, the unremitting attention and perfect accuracy required, the sacrifice is evidently too great to expect from any one unaided farmer. To fix beyond doubt the most inconsiderable fact, requires many experiments, to be made on different soils, in different seasons, and by different persons. When results are intended to be compared, the slightest difference in the process may sometimes make a false conclusion appear true. Hence all private experiments are made with so little care as to be scarcely satisfactory to their conductor, and of no value to other persons. Societies by premiums may effect whatever in this respect is wanting. They can point out the most important subjects for experiments, require attention to every thing which can affect results, and unite the labors of many, for the attainment of a single object. The members of the society which shall commence this course can in no other way draw more honor on themselves, or render more benefit to agriculture. We are ignorant on so many points in husbandry, that the only difficulty would be in selecting subjects for experiments. However little might be done by a single society, yet every premium conferred would mark some progress towards true knowledge. We doubt whether as much could be said for every score of premiums heretofore bestowed.

[*Extract from the Minutes.*]

EDM. RUFFIN, *Secretary.*

SULPHUR IN TREES,
TO DESTROY ALL INSECTS PREYING ON THEM

From the Atlantic Journal.

Farmers and gardeners ought to hail with rapture a safe, certain, easy and unfailing mode of driving away or destroying all the insects, bugs, caterpillars, lice, ants, which prey upon trees and often kill them.

Numberless have been the means proposed or devised to get rid of these troublesome guests, most of which are dirty, costly, or unavailing.—Our farmers appear to have given up in despair the hope of preventing the deadly attacks of *curculios* on the roots of peach trees, and the fruits of the plumb tree. Yet an efficacious mode is said to have been found several years ago in France, perfectly efficacious and applicable to all cases and all trees. The man who discovered it, deserved a splendid reward, yet his name has not even reached us. But we claim the honor to have been

the first to make known the process in America, in 1823 in Kentucky, and in 1827 in Philadelphia. Yet the most useful knowledge is so slow to spread, that the fact is hardly known yet, or doubted by those who know of it.

We are happy to be able to publish two direct experimets in support of the fact and discovery.

1st. We bored and plugged with sulphur in the usual way a plumb tree which commonly dropped every year all the plumbs before becoming ripe, the *curculios* lodging eggs in their germs.—This was done when the tree was in blossom. On that year hardly any fruit fell, and the tree produced quite well.

2d. We find, in the Genesee Farmer, of January 28, 1832, that a young willow nearly killed by aphis or lice, and pismires feeding on their honey. was quite revived in three days, and all the lice and ants driven off, by boring the tree with an auger five feet from the ground and three-fourths through the diameter, filling with brimstone and plugging tight. The tree has thrived ever since The modus operandi of this singular process is very easy to explain. The vital energy of the tree and sap, dissolves the sulphur, carries it into circulation, and involves it in sulphuric gas evaporating through all the pores of branches, leaves and fruits. This gas is a deadly poison to insects and all animals, it suffocates them or drives them away as soon as they begin to smell it; but no injury whatever results to the tree.

We have never heard yet of any direct experiment on peach trees; but we are sure it will answer quite as well. If the sulphuric emanation could not reach quick enough the roots of the trees which are commonly attacked, the plugging must be done near the root or at the time of the descending sap, when it will sooner reach the roots. Let it be tried and the results made known. C. S. R.

SYSTEM OF FARMING.

From the American Farmer.

Penpark, Va. June 12, 1833.

Mr. Smith,—Agreeably to my promise, I have sat down to give you the result of my experience in farming for forty years. I removed from the county of Loudoun, to Albemarle, in the fall of 1799, with but little experience in farming generally and much less in improving worn out land. At that time the whole face of the country presented a scene of desolation that baffles description—farm after farm had been worn out, and washed and gullied, so that scarcely an acre could be found in a place fit for cultivation. It will be well to observe here, that there is a ridge of red land passing through the counties of Albemarle and Orange, whose soil was of the very best quality, and susceptible of the highest degree of improvement, but which had at the same time been *butchered* by that most horrible mode of culture adopted by the first settlers of this country. The practice then was to clear the land, to put it in tobacco for three or four years in succession, according to the strength of the soil, afterwards in corn and wheat alternately, or corn and oats so long as it was capable of producing any thing. They never ploughed in those days, but simply scratched the ground, and this too, right up and down the steepest hills, instead of horizontally, with those little one horse half share or shovel ploughs, until the whole of the virgin soil was washed and carried off from the ridges into the valleys. This is a very imperfect description of the face of the country at the time of my settlement here; I believe it would not be saying too much, if I were to affirm, that there had not been before that period, one good plough in the county. Col. Thomas Mann Randolph, had commenced the horizontal ploughing on his farm; but for the want of good ploughs, it was a long time before he could succeed sufficiently well to induce others to adopt the same plan. Indeed, there were many who, though considered at that time good practical farmers, were disposed to ridicule it for years after Col. Randolph had adopted it. And here, since there has been some little discussion of late in regard to the question, who first introduced this mode of ploughing, I will take the liberty of saying, that there is no person in Albemarle who ever doubted, nor do I myself doubt, that although some considerable improvement may have been made by others since that gentleman adopted it, yet he is entitled to the whole credit of its original introduction, and for which he deserves a monument to his memory.

Suffice it to say, in regard to the condition of the country at the time I speak of, that it wore the most haggard, frightful, poverty-stricken appearance imaginable, never having had upon it either plaster or clover, or, as one might naturally judge from its looks, vegetation of any kind. We had but one alternative in this state of things, either to improve and restore the soil, or to remove to some new and better country; which latter course was the most common—the majority of farmers, after they had impoverished their lands, preferring to leave the improvement of them to others, rather than undertake it themselves. There is here, as in all other places, a great variety of opinions in regard to the best mode of improvement—the maner of ploughing, whether deep or shallow—the time of ploughing—the time and manner of applying manure—questions which must be decided according to circumstances, and not by a single inuariable rule. There are some things, however, which may be considered as all important—such as a rotation of crops, a rigid and scrupulous attention to the collection and preservation of all the manure that can be obtained, and great care in ploughing; for good ploughing, in my estimation, is the first step towards the improvement of an exhausted farm.

I will now proceed to give you a more particular account, both of my practice and success in the business of reclaiming exhausted land. The farm which it is my lot to possess, lies near the town of Charlottesville, has been obtained by small purchases at different times, and now contains from two to three thousand acres. This tract of land is acknowledged by all to have been more completely galled and butchered than any other of the same size in this neighborhood. My practice has always been to plough as deep as possible, and accordingly, my constant direction to my ploughmen (*men*, not *boys*, for I do not suffer boys to plough) is not to be afraid of ploughing too deep, provided, the horses can pull the plough. For some years past I have made use of four horses in flushing the land, but from the great disadvantage they have labored under, in consequence of the very undulating surface of my farm, sometimes ploughing too deep, and at others too shallow—as for instance in ascending a hill, the lead horses would draw the

plough out of the ground, while in descending, they would plunge it so deep as to be unable to pull it at all—I have been compelled to use three horses abreast; which is as small a force as any farmer should think of applying; notwithstanding even this mode has its objections, principally arising from the danger there is, that the horses when turning; unless great care be taken, will cork themselves. Mine have been frequently injured in this way. The plough which I prefer to all others, is the bar-share, called here the Loudoun bar-share, which was first introduced into this neighborhood by myself. I do not mean to say, that there are not other ploughs equally good, but this in the end is the cheapest. For notwithstanding it costs something more than the McCormick, which is our next best plough, though not sufficiently strong for three horses in our rough soil; yet it will last three times as long. The bar-share is now in much greater demand than any other, but unfortunately for us, there are very few to be had, not having any person in the county who understands the manner of making it. This plough not only does the best work but does its work with more ease to man and horse than any other with which I am acquainted.

And here, permit me to say a word in relation to the question of deep or shallow ploughing, which I have seen recently discussed in the Farmer. My opinion, which is founded entirely upon experience, is decidedly in favor of the superior utility and value of deep ploughing. For about twenty years, I have been ploughing as deep as I could on the farm where I now reside, without having in a single instance injured the crop; and more than this, I have, in the mean time, restored the land from the most extreme state of poverty to that of at least good farming land; indeed, a great deal of it is as rich as necessary for a wheat crop. The rotation of my crops has been once in corn, and twice in wheat, rye or oats in five years, giving two full years in five for clover, and in the mean time dressing the land twice with plaster, (or at least rolling all my seed of every description in plaster,) with from one bushel to one and a half the acre. By putting this quantity upon the clover, the spring after it is sown, insures me a crop on almost all my land, sufficiently large to mow. Every acre of my farm not under cultivation is kept in clover.

With respect to the production and the application of manure, I have never pursued any uniform course, but have been frequently making experiments. I was once inclined to believe, that no other way was right, but to haul it out and plough it under as soon as possible, not allowing the sun to shine on it more than could be avoided, and so strong had been the force of habit and of education, that I pursued this course for several years, without ever supposing for a moment that any other course was or could be right. But, as a large portion of my land had been so completely exhausted, and galled and ribbed by rains and bad treatment, that to put upon it manure in its rotten state would be worse than folly, I came to the conclusion, that it would be a better mode to cover all its deep sores with thick plasters of unrotted straw, carried directly from the machine. In order to save labor and time, this straw was carried out as a return load while engaged in thrashing the wheat; for our practice in this county differs from the common practice in many other places, especially at the north, in not stacking our wheat, but in taking it directly from the field to the machine. This mode has been forced upon us by the apprehension that if it were allowed to remain for a long time unthrashed, say till the month of August, it would be destroyed, or at least materially injured by the weevil. But, to the point—I am fully of the opinion, that this description of land cannot be so well improved in any other way as in the one just mentioned, for by the time the coat of straw is completely rotten the land will possess sufficient life and strength to manufacture or produce its own covering. A few other experiments, which I have made in regard to manure, may be worth your attention. In the fall of 1828, I commenced fallowing my land, and carrying out my manure at the same time. The manure was spread and ploughed in with my large ploughs; but as I had a considerable quantity to haul, and some distance to haul it, I did not finish until some time after I had sowed my crop. I made, therefore, four different experiments—a part of the manure was ploughed in with the large ploughs—a part spread on the broken up land and harrowed in—a part spread on the surface after the wheat was sowed—and a part spread upon the snow, according to the practice which, as I am told, exists in Pennsylvania. The first experiment succeeded the best, and contributed most to the permanent improvement of the land—the second did not vary much in its results from the first—the third produced the greatest crop the first year—the fourth did not succeed at all, as it killed a great portion of the wheat.

In regard to such a valuable article as that of manure, it may be well to remark, that very few of us make more than half of what we really might make; and after all, suffer a great deal of what we do make to be wasted, for the want of a little care. All that even our best farmers in Albemarle have attempted to do, is to collect all their corn stalks in some convenient place, to be used as litter for the farm pen during the winter, which, together with a few leaves from the woods, and a little refuse from the farm, is converted into manure. This is about all that we have done yet.

Before I conclude this letter I wish to add another remark, in regard to the subject of deep and shallow ploughing. This seems to be the more necessary, not only because public discussion is now awake, but because I have a fact to communicate, about which I am greatly astonished that so little has been said, and which may afford us some light. It is this—if you plough your land ever so deep, so much so as to hide every particle of the soil, by the next season it will have all returned to the surface without any subsequent deep ploughing—a fact, which I do hope some of your more experienced correspondents will explain for me. In whatever way it may be explained, it does seem to me to speak most powerfully in favor of deep, instead of shallow ploughing. In my view it is reduced to a certainty, that just so deep as the plough goes, just so deep the soil goes and no deeper. The question then comes to this, which is preferable a deep or shallow soil? about which there can be no dispute. When I first commenced the practice of deep ploughing on my farm, the people who passed along the road would stop and inquire with great earnestness, whether I was not afraid of ruining my land. After expressing my con-

viction of its utility, they would most generally reply, that it might do for your wheat, but it would not for corn. But I can only say, that I have found it best for every crop. I would pursue this subject further, but I find my paper giving out. If what I have advanced will aid the interests of agriculture in any respect, I shall be happy. Yours respectfully, and sincerely,

JOHN H. CRAVEN.

P. S. Our harvest has just commenced. In this county, while we shall have more than an average crop of straw, we shall not have half a crop of grain, and even that will be more indifferent than any that I have ever seen, being infested with every thing that is bad—rot, scab, smut and rust.

J. H. C.

From the Abbeville Whig.

DOMESTIC SILK IN SOUTH CAROLINA.

When on an excursion to the country a few days since, we found, much to our surprise and gratification, that some of our female friends had turned their attention to the culture of SILK ; and that many of them had made such progress in this laudable experiment, as already to have realized considerable profit from the production of the raw material, and manufacturing it into cloth. Mrs. Patrick Calhoun, of this district, who, among her other many excellent virtues, is remarkable for her industry and attention to her matters of domestic concernment, showed us in a house which she had fitted up for the purpose, at least, we would say, one hundred thousand silk worms, all healthy and busily engaged, some of them in forming the cocoon and others fitting themselves, for the production of that vlauable material. Mrs. Calhoun, who had tried the experiment last year on a smaller scale than she is doing the present, assured us that she had no doubt, should no unforeseen accident occur, she would be able to raise silk enough by the latter part of August, to manufacture more than a hundred yards of cloth.

We know of two other ladies in this district, Mrs. Covington and Mrs. Baskin, who have been similarly engaged for several years, and we have seen some pieces of silk cloth manufactured by them, which, when worked up into clothes, makes a beautiful and lasting dress. The cloth manufactured by them has sold at this place for $3 per yard, and it is sought for with avidity, not only on account of its rarity, but also for its beauty, durability and cheapness. We hope that our ladies will turn their attention to this interesting, profitable, and laudable employment, and that we will be pardoned by those whose names we have given to the public, for having done so without their permission.

STREETS PAVED WITH SHELLS.

To the Editor of the Farmers' Register.

The perusal of the "Supplementary Chapter" to the Essay on Calcareous Manures, (in No. 2 of the Farmers' Register,) and the inquiry with which it closes, as to the effects of marl in purifying the air and contributing to healthfulness, induces me to mention a case somewhat in point. If I can give you no very satisfactory information, I may be the cause of eliciting it from others.

The streets of Mobile are generally unpaved, and as a substitute for stone or gravel, which are not to be obtained, shells (which have long been untenanted,) are strown over the carriage ways and side walks to the depth of several inches.—These soon become a firm mass, and form a smooth surface, so as to resemble a Macadamised road.—The streets have a remarkably neat and clean appearance, and are much more pleasant than the paved ones.

The shells, which are of various kinds, generally small, are raked up in great quantities in the shallow lakes, and brought to the city in large lighters.

Mobile is much more healthy now than it was before this plan of improving its streets was adopted. It was proposed to "shell" some of the streets of New Orleans, but whether it was carried into effect, I am unable to imform you. The suggestion you have made may call the attention of its citizens to the subject. M.

We thank our correspondent M. for the prompt communication of the fact of streets being paved with calcareous materials: and we shall be still more obliged to him, or to others, for a more minute examination of the effects on the health of the inhabitants of Mobile. The favorable change, in this respect, which he states has taken place, is certainly some confirmation of the opinion maintained in the "Supplementary Chapter, &c." but as the effect was probably never before ascribed to such a cause, all the circumstances will require to be known and carefully considered.

Roads have been made in some parts of Ireland of broken limestone ; and probably the same material (for want of harder,) may have been used there or elsewhere for pavement in towns. If any such fact exists in a warm or unhealthy climate, information of the circumstances might throw much light on this subject.—*Ed. Farm. Reg.*

SUMACH LEAVES.

To the Editor of the Farmers' Register.

Having heard that sumach leaves were purchased by the tanners of morocco leather in Norfolk, and thinking that the article might be worth collecting for market, I requested a friend to make inquiries on the subject, and from him have received the following information.

"The leaves are the only parts of the plant which are used for tanning. They are cured as hay is, and cleaned of twigs, &c. by being beaten with sticks, as grain is sometimes thrashed out of the straw. This is no doubt very tedious—but where there is a good growth of Sumach, as it costs nothing but the labor, I think the farmers in your neighborhood may find it to their advantage to gather and send it to market. Mr. ——, of Norfolk, uses a good deal, and pays for it $1 per hundred pounds."

Sumach bushes grow very thick on light soil of only middling quality, and if once in possession of the ground, would doubtless keep it, without further trouble. The seed we know are very abundant and easy to collect—and it may possibly be worth sowing them over a few acres of hilly land, of small value under cultivation. The red skin, or pulp, which incloses every seed, contains a large proportion of strong acid, of a pleasant taste. *Query.*—Could not this be put to some economical use ? Dispersed as the bushes are generally, the

gathering of their leaves would not be compensated by the price which they command: but the result might be very different on several acres yielding an unmixed and heavy product every year.

G.

For the Farmers' Register.

TURNIPS.

Extract of a letter from a Correspondent in England, to William Prince & Sons, of the Lin. Bot. Garden, respecting the turnip culture in that country.

"The different sorts of turnips are sown thus: the Swedish at the end of May or first of June; a few of the tankard are sown about the same time; and about the middle of June to the end of that month, the globe is sown; and after these, the yellow sorts. Some farmers sow the yellow varieties before the globe—but, as they are very early turnips, and apt to mildew when a drought sets in, we recommend them always to be sown last. The tankard is not generally sown, except for very early eating by cattle, in the month of September; and, in most cases, the white globe is preferred, it being a much more solid root—and, if sown equally early, superior to the tankard. The later sown globe follows in succession; about the month of January the yellows come in; and after them, for spring feeding, the Swedish, which, when pitted before the frost sets in, and kept dry, will remain perfectly fresh and good till the month of June, if that is desired. But here, our cattle are, before that period, either sold fat or put out to grass. The Swedish turnip stands a great deal of frost; indeed, there are few winters in which they are injured by it. But there ought always to be a quantity stored, to be used for food during snow storms. Horses are here fed during the winter, with a few of them daily, along with their other food."

N. B. William Prince & Sons have imported above a thousand pounds of the above turnip seeds.

ON THE IMPORTANCE OF GEOLOGICAL KNOWLEDGE TO AGRICULTURISTS.

To the Editor of the Farmers' Register.

I have read with pleasure the article in the first number of the Farmers' Register entitled "General Description of Virginia." It is pleasingly and intelligently drawn up, and I trust, at some future day, the writer may be induced to furnish you with further details connected with the physical geography of Virginia. These, as they are more or less connected with the mineral resources of the state, are very interesting to your agricultural readers. In whatever direction the traveller turns himself, but especially in the tide-water districts, a steady spirit of inquiry seems to have set in concerning improvements in agriculture. The great importance of fossil manures, or marls, as they are commonly called in Virginia, is fully acknowledged. The intrinsic value of landed property in the lower part of the state, is very much governed by the presence or absence of those marls. Where they do not appear near the surface, either cropping out naturally, or exposed in ravines or the the banks of rivers, by the abrading action of water, it becomes essential to inquire by investigations of another character, whether those marls are not found at depths whence they may be drawn at a cost which may justify their application as fossil manures. The most ready way of acquiring just information on this branch of the subject, is by actual borings in different parts of an estate, and by inquiring into the history of the various wells, if there are any, which have been dug in it. It is impossible for an intelligent mind to engage in investigations of this character, without indulging moderately in speculations concerning the origin of these fossil deposits; whether they are accidentally and irregularly distributed in the places where they are found, or whether they owe their existence to laws as unchangeable as any other natural laws. If investigations practically conducted, result in this last opinion, the improving farmer, before he is aware of it, becomes a student in the principles of geology—principles which will go far to explain to him, without the trouble of boring, whether shells are to be found beneath the surface, and indeed of coming by a fair approximation to the depth at which they lie.

It is by so gentle a transition, the cultivator becomes, in the truest sense of the word, a philosopher, since knowledge can only be dignified with the name of philosophy, when it can be made useful to mankind. The most important science perhaps which has hitherto fixed the attention of men is geology, since it comprehends all the branches of natural science, and obliges us to go inductively into all the details of natural history, with the ultimate view of tracing out all the harmonies of creation, and applying our acquaintance with the laws of nature to purposes conducive to the prosperity of the human race. It appears to me that no condition promises so much unwithering happiness, as that of the farmer, who knows how to enjoy life in so refined and profitable a manner. Such a man's life is a constant act of devotion in the temple of nature. The winds may blow, the rains may fall, but he is not long fretted; he knows such things must be, since they are necessary to the economy of nature; and indeed, he can bring his mind to the belief, without seeing exactly how it is, that they are even incidental to his own prosperity.

I have been insensibly led into the remarks I have made, by a conviction that nothing embellishes life so much as the love and knowledge of nature. A *Farmers' Register* is—and I think I may fairly beg the question—a proper repository for communications connected with any of the branches of natural history, and it cannot be doubted that any papers connected with the physical geography of Virginia, will be very much relished by your readers. We all love variety, for even farmers get tired of reading about barn-yard manure.—The writer of the "General Description of Virginia," no doubt has it in his power to enrich your pages with many interesting details, that otherwise we may for a long time remain ignorant of. The state of Virginia has not yet engaged in the execution of a project of incalculable importance to her prosperity: I mean a geological map of her whole territory, upon which, of a commensurate scale, all her metallic and mineral deposits, her iron, her lead, her copper, her gold, &c. &c. should be accurately laid down, with their localities, direction, elevation, extent and qualities. A map of this character with a detailed report, constructed from personal investigation, by competent persons, would be invaluable. It never can be sufficiently appreciated until it is executed. Men would then

wonder why it had been neglected so long. The state of Maryland has perceived the importance of such an undertaking, and authorised, during the session of her last legislature, a geological reconnoisance, and a report to be made to the next legislature, upon the expediency of ordering a geological survey of the state. If such a measure is important to Maryland, what must it be to Virginia, which is unquestionably—and I assert this, confident that it can be proved—the richest metallic state in the union, to say nothing of the fields of bituminous coal, and the inexhaustible beds of fossil manure in the lower parts of the state? The friends of the state will soon turn their attention to this project, which indeed ought to have preceded internal improvements, it being of the last importance that the direction given to the routes of canals and rail roads, should be much influenced by the local position of mineral and metallic beds, and not altogether—as they continue to be—by the physical geography of particular lines of direction.

Until something of this kind is done, since the class of scientific tourists remains yet to be formed in this country, we shall have to depend, for interesting details connected with the natural features of the interior, upon the communications of intelligent persons respecting their own vicinities.—These will always be valuable in proportion to their accuracy, and they cannot be accurate unless they have been personally examined. It is better therefore to describe with great minuteness what has been seen, rather than to assert any thing upon the authority of others. All the conclusions that are ultimately to be arrived at, concerning the scheme of nature, depend for their soundness upon the precise justness of the facts out of which these conclusions must grow. This is the inductive process, to go from the known to the unknown, and no other can be depended upon. Facts—rigidly so—when concentrated, produce a steady light by which we can walk intelligently amidst the apparent mysteries of nature. We have then some hope of detecting her laws, of finding her out as it were, and making her the constant hand-maid of our wants. A departure from facts is destructive of all useful results: it perplexes the chemist, disturbs the philosopher, and disappoints and mortifies the lover of nature. it is better therefore to say nothing, if nothing has been seen. An experienced naturalist, when he hears of a natural phenomenon, goes to the place, examines, and brings the phenomenon within the regular operation of the laws of nature. He is one of the Cæsars of nature, and is entitled to say his

Veni, Vidi, Vici.

Naturalists and tourists are exposed to disappointments from two species of writers who belong to the genus *non-vidi*. One of these exaggerates, the other depreciates. The first leads us to see a mountain in labor, the second prevents us going to see a real mountiain. I have been led into this observation by a passage in the paper I have already spoken of, the "General Description of Virginia." I imagine the intelligent writer of that paper, in the reading of which I have received much pleasure, has some of his information upon hearsay, I must conceive it to be so, from the following passage, where one of the finest natural phenomena of the state of Virginia, is so slightly and so disparagingly spoken of, although I am sure quite unintentionally.

"There is also a natural bridge in the southwest part of the state, which bears no comparison, in grace of proportion, or grandeur of effect, to the one in Rockbridge."

It may be that the writer has seen both these natural bridges, and that he means merely to express the different manner in which his own taste has been affected by them. I shall therefore merely say that he has expressed himself in very strong terms, and in a manner that might induce many to neglect seeing the first, by reason of its being very inferior to the second, and of the same character. Now they are very dissimilar in character, whilst the dimensions of the one spoken so slightingly of, will one day—when that at Rockbridge has perished, a day perhaps not very distant—far surpass in grandeur of effect, the other. I take it for granted that this last, spoken of as "in the southwest part of the state," is that very singular and unrivalled *natural tunnel*, on Stock Creek, in Scott County, of which there is an excellent drawing and an admirable description in Featherstonhaugh's Journal of Geology, vol. 1. pp. 347, 414, by Lieut. Col. Long, of the U. S. Topographical Corps. Both this and the one in Rockbridge County, have been originally natural cavities in two limestone ridges, which have been unequally enlarged by the action of the streams running through them, and by the disintegration brought about in long periods of time. At Rockbridge, the cavity has been enlarged to a height, from the stream to the arch, of 240 feet, the mass of rock which forms the bridge being 40 feet thick, the length of the cavity is 60 feet, and the width at bottom 45 feet. The total height of this ridge, including the arch and the bridge, to the stream, is 280 feet. Time is gradually dilapidating this majestic structure, the bridge at length must give way, and will leave behind it a chasm of 280 feet high. Whilst this is accomplishing, the cavity of the natural tunnel on Stock Creek, will be enlarging. It now measures from the stream to the roof of the arch 80 feet, having thence to the surface 160 feet of solid limestone. The total height of the ridge, including the arch and the bridge, to the stream, is 240 feet, being 40 feet less than that at Rockbridge. On the other hand, the length of the tunnel is 450 feet, being 390 more than that of its rival, whilst the width at bottom varies from 50 to 100 feet.

Having no object in view but attracting the attention of tourists to this remarkable locality, I shall venture to transcribe part of Col. Long's description of it, from the Journal I have spoken of.*

"To form an adequate idea of this remarkable and truly sublime object, we have only to imagine the creek to which it gives a passage, meandering through a deep narrow valley, here and there bounded on both sides by walls or *revetements* of the character above intimated, and rising to the height of two or three hundred feet above the stream; and that a portion of one of these chasms, instead of presenting an open *thorough cut*, from the summit to the base of the high grounds, is intercepted by a continuous unbroken ridge more than three hundred feet high, extending entirely across the valley, and perforated transversely at its base, after the manner of an artificial tunnel, and thus afford-

*Featherstonhaugh's Journal of Geology, vol. 1. pp 347, 414.

ing a spacious subterranean channel for the passage of the stream.

"The entrance to the natural tunnel on the upper side of the ridge, is imposing and picturesque in a high degree; but on the lower side, the grandeur of the scene is greatly heightened by the superior magnitude of the cliffs, which exceed in loftiness, and which rise perpendicularly—and in some instances in an impending manner—two or three hundred feet; and by which the entrance on this side is almost environed, as it were, by an amphitheatre of rude and frightful precipices.

"The observer standing on the brink of the stream at the distance of about one hundred yards below the debouchure of the natural tunnel, has in front a view of its arched entrance, rising seventy or eighty feet above the water, and surmounted by horizontal stratifications of yellowish, white and gray rocks, in depth nearly twice the height of the arch. On his left, a view of the same mural precipice, deflected from the springing of the arch, in a manner to pass thence in a continuous curve quite to his rear, and towering in a very impressive manner above his head. On his right, a sapling growth of buck-eye, poplar, linden, &c. skirting the margin of the creek, and extending obliquely to the right, and upward, through a narrow abrupt ravine, to the summit of the ridge, which is here and elsewhere crowned with a timber growth of pines, cedars, oaks, and shrubberies of various kinds. On his extreme right, is a gigantic cliff lifting itself up perpendicularly from the water's edge, to the height of about three hundred feet, accompanied by an insulated cliff, called the chimney, of about the same altitude, rising in the form of a turret, at least sixty feet above its basement, which is a portion of the imposing cliff just before mentioned.

"The extent of the tunnel from its upper to its lower extremity, following its meanders, is about 150 yards, in which distance the stream falls about ten feet, emitting, in its passage over a rocky bed, an agreeable murmur, which is rendered more grateful by its reverberations upon the roof and sides of the grotto. The discharge of a musket produces a crash-like report, succeeded by a roar in the tunnel, which has a deafening effect upon the ear."

When time shall have worn the arch of this natural tunnel to within forty feet of the top, it will present a spectable of an arch 200 feet high, and a bridge 450 feet broad; a spectacle that will certainly rival any thing that is now even to be seen at Rockbridge. G. W. F.

James River, July 4th, 1833.

ON THE TIDE WATER DISTRICT OF VIRGINIA.

To the Editor of the Farmers' Register.

An article entitled "General Description of Virginia," placed at the head of your first No. has attracted my attention. It is extracted from the Encyclopedia Americana, a work whose title would seem to promise much. How far this promise has been redeemed, it is not my purpose to inquire.—My business is with this particular article, and I take notice of it, because it has gained a place in your paper, and derived a currency from your name, that may give it a potency, which, from its own merit, it could scarcely have wielded.

The first part of this essay to which I shall call your attention, is in that division of the general description styled "Face of the country." We are there informed that "the tidewater, or eastern section, is, in general, low, level, sandy and unproductive, and parts of it exhibit almost as desolate an aspect, as the pine barrens of Jersey."—Any one acquainted with the country of which this is offered as a description, will be disposed to wonder at the perusal of this sentence. But to develope more cleary the notion that our author has formed of eastern Virginia, it is necessary to follow him a little farther. In the paragraph entitled "Agriculture, Manufactures, &c." he proceeds, "The old practice of clearing and cultivating land every year until exhausted, then turning it out to recover from its own resources, still continues in many places. In others, the *three shift* system still prevails; that is, 1, a crop of Indian corn; 2, wheat, rye, or oats; 3, the year of *rest*, as it is called, in which the spontaneous vegetation furnishes a scanty subsistence to stock; after which the soil is again subjected to the scourging process of cropping, while little attention is paid to the application of manures, or the culture of artificial grasses. This destructive system, for the most part, prevails from the sea-board to the head of tidewater, and on the south side of James river as high as the Blue Ridge."

It is but charitable to suppose that the writer of the sentences that I have quoted, has never seen the country that he describes. And it is unfortunate that he did not know where to look for correct information. His ideas seem to have been taken from the American Quarterly Review for March 1829. In pages 154-5, the Reviewer says—"It is a curious geological feature, that the tertiary with its covering of sea-sand through Georgia, the Carolinas, Virginia, Maryland, Pennsylvania, and New Jersey, should rest immediately upon the primitive, without the intervention of the transitive or secondary forms. The coat of sea-sand throughout the whole space is sufficiently entire to give the character of sterility to the soil, when compared with our primitive and secondary regions. And where the river basins do excavate it, such is the low level of its plain, that the alluvions of these rivers and bays of the sea do but deform it with swamps and marshes, instead of imparting fertility to its lands. The swamps and marshes thus created, generate annual diseases; bilious and intermittent fevers recur as regularly as the seasons, and render this region scarcely habitable, and its population enervated and inefficient. There seems to be no reclamation of these wet and swampy grounds; they lie too low to be relieved by any natural means. This sandy region is a great deformity upon our fine continent, and affects it like a wretched foreground which degrades a picture. It pushes the population away from the comforts and facilities of the sea, and obliges commerce to wind its way up our crooked rivers, to meet this population at their falls, where it finds health and *terra firma*. Our foreign commerce, therefore, sustains much delay, and is burthened with many expenses in encountering the river navigation."

This is, indeed, a worse picture than the other, and is, thus far, wider of the truth. But as I find it impossible to believe the author of the article from the Encyclopedia knew any think of the country that he was describing, I ascribed his opinion to a belief in Mr. Walsh's statement. His

love for Virginia may have induced him to soften his denunciations as he has done.

There is, perhaps, no country in the world which contains a larger proportion of land that will repay the expense of cultivation than eastern Virginia. Some portions of it are poor—and so are some portions of Egypt and Mexico—but I rather think that the whole country included between the meridian of Richmond, (extended to Maryland and North Carolina,) and the Atlantic ocean, would be found, on experiment, to produce much more than the same number of acres included in one body, in any other region of the state. And so would the writer of your article have thought if he had consulted some public documents, and taken the trouble to draw correct inferences.

What opportunities of information this writer possessed, I do not know. But he could not have been ignorant of the sources from which an accurate acquaintance with some statistics, essential to a knowledge of this subject, could be derived. The auditor's office would furnish an account of the taxes paid by the different sections of the state into the public treasury—the census would show the amount of population—and it would not be difficult to ascertain the superficial measurement of every county in the state. Even Mr. Boye's small map supplies this—and the *rule of three* would do all the reasoning that would be needful. Thus, by consulting the census of 1831, we find the population of the state distributed in the proportions of the following table. [The sections are taken according to their boundaries as fixed by the constitution.]

	Whites.	Free Negroes.	Slaves.	Total.
Western section,	183854	1598	18665	204117
Vally section,	134791	4745	34772	174308
From Blue Ridge to head of tidewater,	208657	12026	230861	451542
Tidewater,	167001	28980	185457	381438

And the following table exhibits the number of square miles, and the amount of taxes paid in 1831, when the census was taken.

	Square Miles.	Taxes paid in 1831.
Western, - -	29606	$25849 09
Valley, - -	10294	46654 48
Middle, - -	15160	115600 48
Tidewater, - -	11584	85311 33

Now let comparison be instituted on the numbers furnished by these tables, and some *certain* conclusions may be arrived at, to take precedence, I trust, in the minds of the candid, of the indefinite conjectures set afloat by the prejudices of such writers as the contributor to the Encyclopedia.—Thus it will be found that the western section contains 689½ inhabitants on every hundred square miles—the valley 1596—the middle section 2978—and the tidewater district 3292 on the same surface. Next, that the western section pays of taxes into the public treasury 12¾ cents per head for the whites and slaves—the valley 27½—the middle section 26⅓—and the eastern 24¼. I leave out the free negroes, because *nominally* they pay very little, and, I rather think, that *really*, the treasury loses by their presence in the country.

Again, for every hundred square miles, the western section pays into the treasury $87 90—valley $438 90—the middle district $784 21—and the tidewater $798 31. I have thus instituted three proportions—my statistical references do not enable me to institute any others that would be valuable on this subject. And in two of them the tidewater country—that ledge of sea-sand, interspersed with swamps and marshes, whose soil refuses sustenance to man or beast, and whose atmosphere, charged with *malaria*, and the vapors of the gulf stream, (according to Mr. Walsh,) is deadly as the breath of the Anaconda, exhibits greater resources that any other section of Virginia! And it is our *legislation* and not *nature*, that places us in the rear of the valley and the middle section, in the third. A large portion of the taxes of the tidewater country is paid on slaves. Those under twelve years of age are not taxed; if they were, and the taxes were laid in other respects as they now are, I believe that we should be placed foremost in every proportion that I have stated.—Others may make the calculation from the census, the law imposing taxes, and the returns of the sheriffs to the auditor. I have not done it, because, for my purpose, it was unnecessary.

I may follow out this subject in another number, by giving you some account of the farming of the lower country.

MOCKJACK.

YELLOW LOCUST.

Oak Forest, Rockbridge County, Va.
4th July, 1833.

To the Editor of the Farmers' Register.

DEAR SIR,—I received yesterday the first No. of the "*Farmers' Register*," and am gratified to find that it fully deserves all the praise that I had heard or seen bestowed on it. And I beg leave, on a day so suited as this for *thanksgiving*, to offer you my sincere thanks for thus devoting your time and efforts "to the improvement of the practice, and support of the interests of agriculture."

With this tribute to your work and your motive, permit me to invite your attention to a subject connected with the "interests of agriculture," which has lately attracted mine—namely, the growing of the Yellow Locust in our fields, if not by culture, at least, as *tenants at sufferance*.

A computation of the profit of rearing the Yellow Locust, by *culture*, is made in the last March No. of the "New York Farmer and American Gardeners' Magazine," as follows: It is supposed that an acre of land would easily sustain four trees to the rod, and at that rate ten acres would sustain six thousand four hundred trees, each of which, it is said, would be worth at a ship-yard, when twelve years old, five dollars—but estimated at three dollars each, makes the sum of $19,200

From which deduct for ten years' interest on the value of ten acres of land, - - - - -	$250	
For labor of cultivating by occasional manuring, &c. $40 per annum,	400	
Seed, and two years in nursery,	100	
		750
Leaving net profit for ten years,		$18,450

However astonishing this result may be, it seems to be fairly made, except that there is nothing allowed for carriage to the *ship-yard*, owing, perhaps, to the fact, that where there is easy water conveyance, as is the case in New York, the carriage of lumber is a trifle not worth notice; as it would be in Virginia, if she had canals extending to and through her ample forests.

But *canalling* and *culture* aside—let us inquire

whether, without either, much might not be gained from the locust as a "*tenant at sufferance.*" I use the phrase just quoted in reference to the state of my own farm, much of which having been cleared within the last eight to twelve or fifteen years, continued, for half those periods, to produce a considerable number of sprouts from the roots of defective locusts,* which were felled in clearing; or, perhaps, from seed promiscuously and accidentally scattered over the ground. Many of these I suffered to grow where they came up, partly for ornament, partly for shade for stock, but mainly with a view to future use, for posts, scantling, &c. They require no culture nor attention of any kind, except an occasional pruning to lengthen the stem; they do not injure the crop growing about or under them; and I think I may say that every locust *suffered* to grow, in good farm land, for ten or twelve years, is worth, where grown, for various uses, from one to two dollars. But I will specify an instance, and let you judge of the value of one of my *tenants at sufferance.* I wanted lately three pieces of good locust scantling three and a half by nine or ten inches, and twelve feet long—to have found with certainty, a stock for this small quantity of scantling, I must have gone some eight or ten miles to some rich mountain hollow, except for the trees in my own fields—one of which was selected. It made the scantling wanted, of first rate quality; and there was left of it, what for other smaller scantling and posts, was of equal value to the stock used. This stock was cut down, sawed off, and put on the wagon in less than two hours; whilst to have procured such a one at the distance of eight or ten miles, would have consumed a day, with wagon and team, and two or three hands.†

Now, as "money saved is money made," I submit to you to fix the value of the locust specified.

Very little attention will insure an endless succession to the trees that may be occasionally used on, or spared from a farm; nothing more being necessary than to leave in their stead one of the many sprouts springing up from the roots of the parent stock; the supernumeraries might be set where wanted. And if, as I suppose, locusts do not materially impede the culture or lessen the product in other things of the land growing them, would it not be well for all farmers to have their outside and other permanent lines of fencing pretty thickly set with them, (say two to the rod,) besides some three or four to each acre enclosed?

Perhaps farmers would answer this query themselves, were you to tell them the number of locusts that would be grown, in the way the question supposes—on a farm of two hundred and forty acres, laid off in six fields of forty acres each, telling them also, the value you affix to the locust specified, by Your most ob't. serv't.

REUBEN GRIGSBY.

FARMING IN YORK COUNTY.

Bellfield, York Co. July 11, 1833.

To the Editor of the Farmers' Register.

I regretted that it was impracticable for me to see you and show you my farm when you visited this region some time since. As you well know that my farm when I purchased it was poor, and continued poor for several years, you would have been gratified in finding that it was now tolerably productive; and it would have been interesting to you to have understood the process by which it had been improved. My object now in writing to you is, first, to give you some idea of the manner in which I have managed it, with the result—and to ask you to send me the first number of your Register, and to consider me a subscriber for one year: on the other side you have a check for $5.

As soon almost as I purchased this farm, I discovered that it furnished an abundant supply of marl. I began to carry it out, but found that it involved a great deal of labor; and my force being limited, I determined to ascertain whether marl was equally beneficial in each of my fields, and then to wait until I could be certain whether its effects were lasting or not; devoting much of my labor to making manure, and in hauling out manure from town, where I could then procure it in large quantities, whilst I waited to see the result of the experiments made on the marl I carried out. I followed this course steadily for six or eight years. My fields improved every year.—Manure in the meantime became scarcer, as others came into competition with me, and the price increased. I found that the improvement from the marl was lasting, and that every soil was greatly benefitted by it, but that the stiffer the land, the larger the quantity which was required, to give it equal improvement. I then set to work in carrying out marl, with the design to marl all the land which I cultivated, and have now covered two hundred and thirty-four acres with this valuable manure.

I did not relax in my efforts to raise, and to haul out from town all the manure that I could make, and all that I could procure; and it has become a fixed rule not to cultivate a hill of corn that has not been manured in the course of the winter and spring. I began by manuring broad cast, then I came down to manuring in the drill, taking care to reserve a sufficiency of manure to give a double handful of well rotted manure to each hill, which I put around the corn after the first weeding, and immediately cover with a small Freeborn plough, running one furrow on each side, with the mould board next the corn. The corn manured in the hill produces almost as well as in either of the other methods; but of course the small grain which follows the corn is much less benefitted than by the other manuring.

My experience satisfies me that neither the four or five field system will answer on my lands. They are subject to wire-grass, and unless a cleansing crop is raised once in three years, they become so foul, that the labor of raising a corn crop is scarcely compensated by the produce: and moreover, the fields grow up in bushes, and briers, and other things, so extensively, that every fourth year great labor is necessarily expended in clearing them.—The small grain crop too, after a fallow, is almost always very much injured by the fly, even when the small grain after the corn escapes entirely. Hence I have given up fallowing and have returned to the three field system, and the rather because I have found the corn crop by far the most certain, and indeed more valuable than the wheat crop.

Marl in the proper quantity I regard as very

* The locusts of our common forest land are generally defective—not so when grown in cultivated fields.

† With us, a wagon, team and driver, is usually estimated at $3 by the day.

important, more especially for the corn crop. I have used it very liberally on some parts of my land, and I have not found eight hundred bushels to the acre too much for my stiffest land; but I have used about four hundred bushels generally to the acre. On small portions of my fields which are light with considerable sand, two hundred and fifty bushels have been used, and found to be equal to six hundred on stiff lands. I scatter it whenever I can do so, on the surface, after the land is fallowed, having ascertained that the first corn crop is but little benefitted by the application of the marl before the land is ploughed. I may not be able to give the true reason, but the fact is clearly established as well as the other, that when the marl is scattered on the surface of the land after it is fallowed, the first crop is as much benefitted as the second. I suppose, that when applied before the land is fallowed, the marl, in fallowing stiff land with a sward on it, is deposited in rows below the furrow slice, by the operation of the plough; and is not during the whole season, brought up and mixed with the soil. It is different, when the land is light, since the furrow slice does not adhere as in stiff land, and the marl is mixed with the soil to a considerable extent in the fallowing, and pretty well mixed afterwards during the cultivation of the corn.

I have found it necessary to lay off the land in depositing the marl, that the same quantity nearly may be used on each acre, and the best method that I have been able to devise, is to make a chop where the marl is to be deposited from the cart.—Many of my acquaintances run furrows each way at the distance of eight or ten yards, and drop a heap nearly in the middle. My foreman takes poles 10½ feet in length which he sets up in a row. He then steps off seven yards along the row thus indicated by the poles, and makes a chop; and so he proceeds along the row, making a chop at the end of each seven yards, and moving the sticks or poles as he comes to them. Thus the plough is dispensed with, and the places are marked out with considerable accuracy; although the distance but one way is measured, yet after a little experience, the chops even the other way are made with sufficient accuracy, and much time is saved. I adopt twenty one feet, because it is the distance best suited to scattering with ease and despatch; and because, as you perceive, each bushel of marl for the square of twenty one feet, will give as nearly as may be, one hundred bushels to the acre. If then the load be ascertained, there is but little difficulty in putting out the marl so as to give the quantity desired to each acre. The marl being carried out before the land is fallowed, the interval between each row of heaps may be ploughed before the marl is scattered, and thus the carting over fallowed land is avoided, and the marl is scattered over the land ploughed, save the rows of marl heaps; and when they are ploughed up, an additional quantity might be given to them, and if not, only a small part of the land will be marled before it is ploughed.

It is of great importance that vegetable matter should be given to the marled land; but as a gentleman in my neighborhood, of much experience on this subject, has often remarked to me, "any trash will be of high advantage, when the same would produce no good if used without the marl."

I observed before, that corn was by far the most certain crop with me, and as is believed, for all our lands below the falls and off the rivers; and probably the most certain also on the rivers. Hence I am persuaded that it ought more to be relied on than it is by the farmers, for their sale crop. Some disaster blasts the hopes of the farmer from his wheat crop almost every year; whereas, the corn crop does not often fail. And it is a mistake to suppose that the labor and expense of the corn crop exceeds that of the wheat crop much, if at all. Being convinced of this from the closest observation, so far as my experience goes; and this opinion being confirmed by the superior success of the farmers in the corn districts over those of the wheat districts, as far as my observations extend, I have determined to make my corn crop my principal object; and to that end, I shall raise oats for feeding, to save the corn, which will enable me to put in my wheat crop with more ease, and during the period in the fall best suited for it.

I know that but little credit is due to the theories and views of those who are not successful in farming; and that I may remove this objection to my notions of the management of a farm, I add that my fields now produce at least twice as much as formerly, and that my field of corn last year (every hill of which was manured for the crop, and only about three-fifths of it marled,) averaged me a little above thirty bushels to the acre.

JAMES SEMPLE.

For the Farmers' Register.

QUERIES RESPECTING SASSAFRAS BUSHES.

1. Can any reader of the Farmers' Register direct how to eradicate the growth of sassafras in cultivated land?

2. Can any *medical* reader say what are the properties of the mucilage which the leaves of the sassafras contain in such abundance, and whether if extracted it might be put to any valuable use?

For twenty years I have been trying to destroy this growth on a part of my farm, and to such little purpose, that I verily believe there are now as many plants growing as at first. It has not only been subjected to all the assaults from ploughs and hoes, incidental to good tillage of corn and wheat, but for several successive years, I had the plants grubbed up in August, whether the land on which they grew was at rest or under a crop. The land so infested is sandy, and was formerly very poor, and is now only of middling productiveness: but it does not appear that any improvement, or injury to the soil, materially affects this abominable plant. Except for the trouble of grubbing which it causes, I do not know that it is injurious to the cultivation and product of corn; but the young shoots greatly hurt the growth of wheat, and make the reaping as wasteful as it is troublesome.

If this should be read by any farmer who is so lucky as not to be acquainted with sassafras bushes, he will wonder why grubbing up by the roots does not effectually destroy each plant so treated. But the truth is, that the root can only be cut below the surface of the earth, and never is (and perhaps cannot be) completely taken up. So deep as the grubbing of small shrubs usually goes, (say six inches,) the smallest, as well as the larger sassafras bushes have only one perpendicular main root, which does not diminish in size as low as it is seen. When cut off by the grubbing hoe below the usual track of the plough, several young

shoots soon start from below the wound, and if then let alone the grubbing would serve to increase the number of stems three-fold at least. The succeeding tillage at every operation again breaks off these young and tender sprouts; but when left undisturbed, by the field being laid down in wheat, the sassafras starts with new vigor the following spring, and rises as fast as the crop. I admit that this growth has been generally the larger on my land, because (from neglect) the last shoots of the previous autumnal growth were seldom effectually grubbed at the time of sowing wheat—but the most careful and thorough grubbing at that time, would not lessen the number of sprouts that would be found the next harvest, though it would make their size less. My next neighbor, who is not less annoyed with these shrubs, tried a plan for their destruction which at first I thought would be effectual—but the event showed that he had gained nothing by his great additional labor. His method of grubbing was as follows. The laborer dug away the earth from around the perpendicular tap root until he came to its origin; and it was always found to proceed from a larger horizontal root which extended to unknown distances, so that one of these roots might perhaps throw up sprouts from various places for an extent of twenty yards or more. These horizontal roots were generally ten or twelve inches below the surface, and confined to the very sterile subsoil. As it was impossible to get up the whole of these long roots, (which probably form a sort of open net work under a whole field,) a piece was cut out wherever a sprout (even the smallest) grew from. This was in August. The large holes dug for this purpose were left open, and soon new sprouts could be seen putting out from both ends of the separated roots. Thus my neighbor's work served (like the cutting up of the polypus,) to cause two to live where there was only one before.

But as I almost despair of destroying sassafras, I rest my hope for relief on its being discovered to be a valuable crop. Upon chewing the leaves, at any time from their most tender and succulent state to their full maturity, they will be found full of mucilage, which it seems likely may be of use in medicine, or the arts. It is well known that every part of the sassafras tree has a delightful smell, and a pleasant taste. The blossoms dried, and the bark of the root, make a tea which is so agreeable, that I think nothing but the abundance and cheapness of the material has prevented its being generally used for this purpose. About twenty years ago a trade in the roots of sassafras was commenced by sending it from James river to England, where the use of the tea was extending among the lower classes. The roots commanded a good price, and the trade promised to be profitable to us: but the jealousy of the East India Company (as it was said) caused this new trade to be quickly destroyed, by new and prohibitory duties on the article. During the few years that the exportation continued, the large roots of nearly all the sassafras trees in my neighborhood were dug up for that purpose; but as there was no difference of price offered, the roots of small shrubs, (though vastly superior in delicacy and strength of flavor,) were never used for sale, as they were much more troublesome to collect. If the purchasers had known the difference of value, a ton of small roots would have been sold for as much as twenty tons of whole stumps and large roots of trees, which formed nearly the whole amount of the commodity exported.

I should have stated that the field which is so full of sassafras shrubs, has not been grazed for more than fifteen years—which protection of course has given them the better opportunity to thrive. Grazing, however, would have checked the evil but very little. What makes this growth the more strange, is that the land before being cleared had but very little on it. I have cleared a considerable extent of poor woodland, where there were so few sassafras trees, (and most all of these small enough to be grubbed up,) that a slight observer would have pronounced that there were none.—Yet in these fields, and on very stiff, as well as on light soil, their growth has since so increased, in spite of the usual cultivation, as to threaten the most serious injury to the future crop of wheat.

ANTI-SASSAFRAS.

ON DISTEMPER AMONG CATTLE.

To the Editor of the Farmers' Register.

The objects of husbandry are so numerous, and many of them involved in so much mystery, that no one man can attain to great success, without the aid of others. This noble art requires that its votaries should be extremely liberal, if they would become prosperous. A free interchange of opinion may often serve to elicit truth, even in matters the most intricate. With such views, I lay before you some suggestions on the disease among cattle, usually called the "*Distemper*," which though far from satisfactory to myself, may lead to a full investigation in the Register and to important results among our farmers.

That this disease is propagated by those cattle which are, or have been the subjects of it, forms the basis of the opinions which I would now present.

I believe the opinion has heretofore most generally prevailed, that the disease has spread from the effluvia produced by the carcasses of animals dying of it, and from their bones. This belief, I suppose, gave origin to the law requiring that such carcasses should be effectually buried, or burned, and forbidding even the preservation and tanning of their skins. This law was, for a long time, rigidly enforced, in my neighborhood, but so thoroughly are we convinced of its inefficacy, that it has now become a dead letter, except with such persons as conscientiously obey every law of the land—as such—however burthensome they may esteem it.

Every one familiar with the disease, must have seen cattle, not infected, bellowing the funeral obsequies of its victims with impunity, while nothing but a line-fence debarred them from absolute contact with the carcass. Nay, I have often seen my dogs bring the bones of cattle dead from distemper, among mine which had not been exposed; and I was at first alarmed for the consequences—but none had ensued. Having an extensive common near me, I have permitted the greater part of my cattle to range at large, and have retained, in an enclosure, a few favorites, together with my working oxen, and those intended for such. These two portions of stock have been very cautiously kept asunder. The disease for several years destroyed some of the first, while the latter were en-

tirely exempt from it, until one of the oxen broke the fence and grazed, for a short time, among the exposed cattle. He died in a few days of distemper.

It may be said, that all admit cattle may take the disease from grazing with the infected, but that this does not imply that they cannot take it in any other way. Nature, though rich in means, is economical in using them, and we generally find but one cause used in the production of an effect. This cause, in the propagation of infectious disease, is usually something generated in the sick, and applied either by actual contact, or in the form of effluvia, to some secreting surface of the well. From what was said above, it appears probable, that this distemper of cattle is hardly produced by effluvia, and I infer that a sufficient cause may be sought, in the application of the saliva of one cow to the mouth of another, from her eating food previously besmeared with it.

In confirmation of this opinion I will state a few facts, whose bearing on the subject you will readily infer. I have been credibly informed of a wealthy gentleman, who more than twenty years ago, on finding that distemper had invaded his herd of cattle, ordered that every animal seized with it, should be confined in a particular lot, never to come out alive. Those that died of the disease were deeply buried, and such as recovered were fattened and slaughtered for beef. This prompt measure, is said to have been succeeded by a perfect exemption from the disease.

Two other gentlemen, within my own knowledge have enclosed extensive parcels of land, almost literally whitened with the bones of cattle which died of distemper, and made pasture of the very lands thus included. One of these has enjoyed perfect exemption from the disease, for ten or twelve years. The other had his cattle infected, by getting on a common, after total exemption for about the same term.

In districts where this disease prevails, it is generally known, that there is no danger to oxen of receiving it, in however exposed situations they may be driven, provided they are kept well muzzled. This precaution was much observed in this section some years ago, but the terrors of the disease wore away with its novelty, and we have become more careless.

It may be thought singular, that an animal, after an apparently perfect recovery from a malady, should be capable of communicating it to others. There is no analogous case, in our own species, but there is one in the horse, which, I think, is just in point. The matter, I believe, is well settled among farriers, that a horse may apparently recover from the glanders, and still communicate it to every other horse, that wears the same bridle, or eats out of the same manger.

I believe, however, that the cow which has once suffered from distemper, is liable to slight annual returns of it. And it may possibly be, that she is only capable of communicating it during these returns. I have known two cows that appeared to have distemper slightly every summer. One of these was my property. This cow though apparently healthy, had a yellow liquid continually dribbling from her nose, and her hair had a dead appearance, even when she was fat. Suspicion of keeping up the disease among the stock, fell so heavily on her, that I caused her to be killed about four years ago; since which time I have known but one case of distemper among my cattle, and that occurred a few days ago to a cow running on the exposed commons.

Some think this whole subject so deeply mysterious, that it is utterly useless to attempt its investigation; and others, that the land on which cattle have the disease, in some strange way, becomes poisoned and remains so for an indefinite period, and that there is no hope that it ever can be disinfected. We would remind the first of these, that the small pox—which has, perhaps, destroyed more of our race than any other disease—existed for two centuries in England, before any idea was formed of its laws of infection, or any rational mode of treatment discovered. The opinion of the latter is so much opposed by all the operations of nature, that we could never adopt it, while any other mode of accounting for the facts could possibly be found.

On the treatment of this disease I have but little to say. Some very active remedies have been recommended, and many very trivial nostrums with the utmost confidence urged; but I have never known one of the worst cases cured by any thing. When the disease appears in a mild form, the animal is disposed to eat a little, and shows no particular indisposition to motion. But the symptom, on which I have chiefly placed my hopes of recovery, is the character of the urine; whenever this assumes the appearance of a solution of copperas, although sometimes nearly black, I expect recovery, whether the animal is physicked or not. But when the urine is bloody, I forebode speedy death, for, with this symptom, I have known no cure effected. The same symptom occurs among the cattle in Scotland, affected with the disease there called the bloody murrain, and I have from that circumstance suspected the identity of the two diseases. It is said, that the distemper among our cattle was brought here by droves from North Carolina. Some parts of that state were settled almost entirely by a Scottish population. Is it not possible, that the disease was originally imported from Scotland? If so let us call it the murrain—for I have long disliked to hear it called the *Carolina* distemper, as the use of that name seemed to imply a reproach on our very respectable sister state. In Scotland, for the murrain, they recommend strong saline drenches, boiled milk, and other articles calculated to produce great thirst, hoping, by afterwards allowing copious draught of water, so to attenuate the blood, as to change the character of the urine. From such remedies, however, I would expect nothing in the distemper of our cattle. Were I to recommend any thing with this indication, it would be some cheap diuretic, in copious drenches, such as melon seed or parsley root tea. But the disease seems to take deeper hold than merely on the blood. There is derangement in all the secreting organs, the stomach—the liver—the kidneys, and indeed every important organ is frequently gangrenous, and in one instance, I saw blood oozing through the skin, like drops of sweat, before the death of the animal. If any effectual remedies are ever discovered, they must be such as will act upon the solids.

The means for prevention, promise little more than those for cure. I would judge, however, that such treatment as would contribute to the health and comfort of an animal, might enable it better to resist the contagion of disease. To this purpose,

besides a sufficiency of wholesome food, nothing can contribute more than an unlimited supply of salt. And I am inclined to think, that those cows which have a sufficiency of this article, are more apt to escape the disease.

Mankind have been long disposed to rely on tar and other strong scented substances for the prevention of disease. Surely the smell of goats might stand a fair candidate for the honor, if any stinking scent could charm away distemper.

Candor requires, that some facts that seem to oppose the opinion advocated above, in relation to the mode of contagion, should be noticed. Cows have been known to die with symptoms of distemper in the heart of cities, while confined in close lots, and secluded from all intercourse with other cattle. I admit this to be a fact, and feel the force of the difficulty arising from it. The solution, however, may depend on minute circumstances with which I am unacquainted. The only case of the kind, which has come under my personal observation, was that of a cow, which died in three weeks after being closely confined in a lot in Richmond. Being ignorant of the time which may elapse between the period of exposure and of attack, we cannot determine that this animal did not contract the disease on her way to Richmond. But admitting that she took the disease after arriving in her lot, I know no more probable supposition of the mode, than that her hay or other food had been accidentally besmeared with the saliva of some distempered animal. This, in a country, like that around Richmond, filled up with infected cattle, would appear not at all improbable. Very possibly, she was fed on food hauled to town by oxen of this description, and their driver would be apt to permit them to have access to their load.

The distemper may be called a summer disease, occurring according to my observation, between the first of June and the first of December. Much the larger number of cases occur in the heat of summer, and very few, as the cold season advances. This may possibly be, because there is less grazing in cold weather, and the herd of each owner is confined to itself, so that there is less opportunity of spreading the disease in winter. But, a tendency to peculiar prevalence at some particular season of the year, is a characteristic of, perhaps, every infectious disease, in man or beast. Whether the period between exposure and attack is limited as in most infectious diseases, or without limit, as in hydrophobia, is a question unsettled.

It is very certain, that hot weather operates powerfully in exciting the virus to action. From my observation, I would judge the period, between exposure and attack, to be within the limit of three or four weeks, and that an animal having escaped for this length of time, is in no danger until a fresh exposure. A large number, however, of those exposed, escape entirely, or have the disease so mildly that it is not perceived.

The object of this communication is chiefly to excite inquiry. If it should be found on farther investigation that the disease owes its continued existence to those animals solely, which have been subjects of it—then there would be hope of exterminating it, by removing from our farms, every one on which suspicion could possibly rest, and supplying their places, by an entirely new stock.

The custom now is, to place a higher value on those cattle which have recovered from the disease, under the impression that such will enjoy a future immunity from its attacks. This may long be the case, in cities and villages, where a family rarely keeps more than one cow. But surely no farmer would desire to keep an animal, whatever might be its intrinsic value, could he once clearly ascertain, that it carried about it a poison capable of perpetuating such a disease among his stock.

A. B. C.

YELLOW LAMMAS WHEAT, AND HAYMAKING.

To the Editor of the Farmers' Register.

Sir,—I hail the appearance of your neat and well filled journal, as one of the cheap and efficient means of disseminating information, and, of gradually correcting the unprofitable management and slovenly culture among us farmers. It has probably been owing to the want of such journals, that attemps to get up and keep alive agricultural societies have proved abortive, in so many instances in this state. It seems to me, that a periodical destined to be as deservedly popular as yours, could not fail in efforts to revive and keep up one common, and sundry auxiliary societies. And would they not have as salutary an effect upon your paper, as it would have upon them? Of the advantages of this reciprocal action, you are better qualified to speak than I am.

In the present comparatively low state of agriculture in Virginia, it is proper that we should seek a knowledge of the improvements that have been made both at home and abroad—and communicate, for the public benefit, whatever, in our own practice, may be thought useful. I trust that your call for communications, and for a free and generous interchange of opinions, will not be unheeded. I avail myself of your invitation to do so, and ask of some of your readers to inform me where I can procure about fifty bushels of seed wheat, of the kind cultivated in Virginia some thirty years ago, and called

YELLOW LAMMAS WHEAT.

It was a favorite with many persons. Mr. Richards who had long experience in the milling business in Richmond, thought it greatly preferable to any of the new sorts to which it has so generally given place,—the cultivation of it has been abandoned probably by many persons, more from the love of *change* and of *new things*, than from a careful comparison with other varieties.

All that I know of it myself is, that a judicious farmer in Amherst never could be persuaded to try any other kind, and that his crops were better than his neighbors'. But he has been dead more than twenty years, and I have not ascertained whether or not the family have "kept in the seed." It is a bad practice, too hastily to give up old things for new ones, without properly testing their comparative merits. Among the wheats of "olden time," the *purple straw* has retained so much favor as not to have been discarded.

I am a young farmer; but I am old enough in the business to know, that the best and the worthiest men, and some of the most intelligent minds, are frequently deceived by false theories and ardent sanguine temperaments. If this remark should be thought more peculiarly applicable to politicians, physicians and metaphysicians; yet, it may be too often justly applied to farmers.—hence it is, that scientific researches and de-

velopements in rural economy, are received with so much jealousy by the mass of cultivators. And hence, my dear sir, the propriety, (if the general good be the object,) of writers for such a journal as yours, signing their *names* to what they recommend to others. I speak generally; for, in some cases, it may be both improper and unnecessary to do so. Tuition in the school of *experience* is much *dearer* than in the school of *books*—still they mutually aid each other; for, the lessons of the one are learned as soon again with, as without, those of the other. Every one will acknowledge the aptness and truth of your remark, that "speculative opinions, or pieces merely argumentative, require not the authority of *names* to give them character: they carry with them their own truth and force, or their fallacy and weakness."

The article you have copied from the London Farmers' Journal, and your own remarks

ON HAY MAKING,

induce me to offer to your readers a suggestion on that subject which is the result of costly experience. I lost two fine crops of clover hay, by attempting to cure it up too green; and I have had some herds-grass injured in the same way. To avoid similar losses I now put up the hay in very tall cocks, and as small at the bottom as they can be made. In the commencement of this practice I found that the wind, when strong, blew off nearly one third of the hay, and that it was, consequently, much damaged by rain or by too much sun—to remedy this, I now use SKEWERS, about the size of the wrist, and from five to seven feet long, sharpened at both ends. The hay ought to be put into cocks the same day it is cut and as soon as it falls, or becomes limber and tough.—If the weather be warm and the atmosphere dry, they may be doubled the same day. When the cocks rise five feet high, the skewer may be run into the top and pressed down eighteen inches or two feet. Around the part of the skewer which rises above the cock, more hay may be put in the manner of stacking; and in finishing off the cock, the masses of hay delivered by the fork should be put on the top of the skewer and be pressed down, as long as any can be made to stay. The little stack will then be in the form of a sugar loaf; and its diameter so small that no injury need be apprehended from over heating. The most convenient fork to be used is that which has four crooked steel prongs and a spadelike handle. It is entirely unnecessary to scatter the hay about the ground to cure it, as is the common practice.—When the crop is very heavy, the swaths may be doubled or trebled after a few hours' sun, and somewhat loosened up by the fork in doing it.

Herds-grass ought not to be cut until the seed are nearly ripe—say when the heads begin to turn brown. The same remark applies to clover—allowing only a third (or the old heads) to get brown.

The cocks of any grass, except clover, put up in the manner I have described, will remain uninjured until the heavy rains of the fall set in; and then they only become damaged at the bottom. It is a great convenience, at so busy a season of the year, to cure a crop of hay so expeditiously; and then, to be enabled to leave it in the field without risk until other crops are disposed of.—The skewers may be either of split timber or of the young growth in the woods. They ought to be preserved from year to year. The great advantage of using them cannot fail to strike the mind of every reflecting, practical farmer. A little experience will teach him how to make his cocks so as to prevent their capsizing or leaning one way or another.

Clover hay may be cured in this way; but it cannot be safely trusted out too long; for, when cured, the rain passes through it readily and destroys it. Yet, when raised into very tall cocks, by means of the skewer, it may be brought to so sharp an apex, that it will turn rain pretty well. This *mite* of practice is cheerfully offered; and I shall thank any gentleman for a similar one, that will be as useful to me.

After my personal respects, I offer you my hearty wishes for the success of the Farmers' Register.

C. W. GOOCH.

Airfield, Henrico, July 6th, 1833.

From the Genesee Farmer.

INFLUENCE OF THE MOON.

On the influence of the moon upon the seasons.

BY M. OLBERS.

The moon acts upon the earth in a manner certain and demonstrable; for it enlightens our nights, it draws the earth a little from its elliptic orbit, it occasions a small oscillation in the earth's axis, it produces the flux and reflux of the sea, and an analogous but less motion in the atmosphere. But it has been the general opinion of mankind, from time immemorial, that beside these demonstrable effects, the moon, according to its different phases, exercises a considerable influence upon the weather, upon the health of mankind, upon animals, upon vegetation, and on chemical operations. Experience alone can throw light upon this subject; for it is possible that the moon may have an influence upon our atmosphere, produced by the different forces of attraction which it exercises at different times—and also by its light. Long and well-conducted experiments have completely refuted such hypotheses; they have proved, that neither the lunar phases nor the situation of the moon with respect to the sun and earth, have scarcely any influence upon the weather, for no fixed relation whatever can be discovered between them, notwithstanding the vast number of trials and observations which have been made for a great number of years. The results deduced from one series of meteorological observations are always contradicted by another series; we cite for example, *Howard*, who believed he had discovered that the barometer rose most frequently in the quadratures, and that its fall was most common in the syzigies. *Cotte*, on the contrary, to whom meteorology is much indebted, and who commenced in order to confirm the remark of Howard, afterwards found by twenty years observation, that the barometer was the highest at the time of the *new* moons, and lowest at the time of the *full* moons. *Lalande* and *Lamark* have drawn from their observations the most opposite results, respecting the effects of the moon in her passage by the plane of the equator. But a decisive proof of the small influence of the moon appears to me to result from this circumstance, that this influence, by whatever forces it may be produced, known or unknown, ought to be the greatest possible between the tropics; how-

ever, in the equatorial regions, not a trace of it can be found. In these countries, the heat, the rain, the winds, &c., all depend on the distance of the sun from the zenith of the place, without any regard to the situation or the *phases* of the moon. We may be yet more convinced of the smallness of this influence, if we reflect that the most opposite weather, in different parts, takes place at the same instant of time, and consequently, under the same lunar phase. This fact is determined, with the greatest evidence, by the accounts of the weather which we receive from different places during the time of our eclipse. *M. Bode*, for example, has collected the remarks made during the time of the solar eclipse which happened on the 18th November, 1816; where we perceive a strange mixture of good and bad weather, without any respect to order, spread during this day, through a great part of Europe. Professor *Brandes* having compared with great labor, but in a very instructive manner, the variation of the weather which took place over a great part of the earth's surface in 1783, found no relation between it and the lunar phases; and if a variation in the weather appeared to coincide with these phases in any one country, no variations, or opposite variations, took place in other countries. The periods of eighteen and of nineteen years, make no discovery of any sensible analogy in the variations of the weather, during the years equally distant from these intervals.

Some have pretended to have remarked sensible effects produced by the rising of the moon, and by her culmination; but the phenomena cited by them, either do not prove this influence, or are not accurate. Several of our mariners also hold that the full moon when rising, dissipates the clouds; but this prejudice owes its origin to the circumstance, that the clouds commonly disappear during a tranquil evening, and consequently also at the rising of the moon, according to a very just remark of *M. Brandes*. The pretended observation that a storm cannot approach from the zenith at the time of full moon, contradicts itself; for the electric cloud which is at the horizon of one place, is at the zenith of another place not many miles distant. But in asserting that the lunar influence upon the season is extremely weak, and that it is nearly lost among the other causes which produce a variation in the weather, we are not certain that the moon does not produce some little effect. Let us see what the theory seems to indicate. The moon and sun produce, twice in twenty-four hours fifty minutes, a flux and reflux, both in the ocean and in the atmosphere: these motions vary with the phases of the moon; they are the strongest in the new and full moons, and the weakest in the first and last quarters. Let us suppose, for example, that the tides of the atmosphere produce a change of .0354 of an inch in the height of the barometer, in syzigies; it will produce only half that variation in the quadratures. Now, though these effects are so weak, it is not impossible but that the strong tides at the new and full moon may *dispose* the atmosphere to receive considerable motion. We dare not, therefore, declare as absolutely false, the observations which some philosophers pretend to have made, namely, that more storms happen at the time of new and full moon, than at the time of the quadratures. It is the same with respect to the passage of the moon through the equator, and through the perigee; at these times it may act as an *exciting cause*, although no violent motion be produced by it in the atmosphere.

The moon may also have an influence upon the variation of the weather, in an indirect manner; that is, by the motion of the waters of the ocean, at least upon some coasts. It is true that in the open sea, the height of the tides never exceeds three or four feet; but upon the coasts, in bays, and narrow channels, the rise of the tides is much more considerable. At Brest, for example, it rises more than twenty feet, and at Bristol more than fifty. Ought not the motion of these large masses of water to occasion some variations in the atmosphere, especially as they appear to have a small influence on the electricity of the air? The inhabitants of the sea coast believe it to be a fact, that the changes in the weather, and the force and direction of the wind and clouds, depend on the tides. We may here observe, that the tides of the ocean, and those of the atmosphere, do not happen at the same instant, though both are produced by the sun and moon, and both have the same period. The air being easily moved, and not being hindered by any obstacle, instantly obeys the attractive force of the moon; but the waters of the ocean are more tardy in obeying this force. On this account, the atmospheric tides immediately follow the passage of the moon over the meridian; but high water in the open sea, does not take place till three hours afterwards; and on coasts and in bays, it happens still later. It is possible then, that the *mediate* and *immediate* effects of the moon upon the atmosphere, in some places, mutually destroy each other; and this is perhaps the cause why the astronomer *Horsely* at Oxford could not perceive in the English observations any relation between the weather and the phases of the moon; while, *Toaldo* at Padua believed that he *could distinguish* the moon's influence in the observations made during fifty years by *Poleni*. Now though I would not deny but that the results deduced from observations by *Toaldo* might be partly true for the climate of Italy, I must still observe that from the great number of exceptions to his rules, he was himself convinced that the lunar influence was *extremely small*. A series of experiments for many years has convinced me, that in our climate, where the weather is subject to more considerable and more numerous variations, the rules of *Toaldo* are entirely wrong. For example, on the 7th of December, 1813, the full moon coincided with the perigee, and two days after the moon had its greatest northern declination; so that from the principles of *Toaldo*, the lunar influence ought to have been the greatest possible; but notwithstanding all this, there was not any sensible change in the weather. I believe then that I have *demonstrated* that the influence of the moon upon the weather is so small that it is totally lost among the infinite number of other forces and causes which change the equilibrium of our very moveable atmosphere. The influence of the moon upon the weather, and upon the atmosphere, being so insensible, we are entitled very much to suspect its pretended influence either upon men, animals, or plants. In fact, it is *all of it* due to illusion and prejudice. It is evident that the duration of the period of some phenomena exhibited by man in health, agree only nearly, and never exactly, with the lunar revolutions; and that these phenomena

show themselves under every phase of the moon, not only in persons of the same age and of the same constitution, but also in the same individual. This alone is sufficient to show that the moon has no influence, and all *modern physicians* are agreed on this point.

I have little faith in the observation of *Sanctorius*, namely: that men in health gain one or two pounds in weight at the commencement of the month, and that they lose as much towards the end. In the same manner, observations made with the greatest care have induced me to doubt very much the remark cited by the poet *Lucilius*, and often since repeated, namely: that lobsters, oysters, and other shell fish, are fatter while the moon is on the increase, than when she is decreasing. A very little attention will convince us of the nullity of this assertion; especially if we can but credit the remarks made by the able physician, *Rohault*. I have the greatest confidence in the very careful experiments made by the celebrated agriculturists, *Laquinterie*, *Nardmann*, *Reichard* and *Hartenfels;* also by the great naturalists *Buffon* and *Reaumur;* who proved distinctly that the increase or decrease of the moon had no influence, either upon the germination of seeds, or upon the increase of plants, or upon the rapidity of their developement, or upon their quality. I have also much difficulty in believing that the light of the moon produces a particular effect different from that of any other light. The experiments made in Rome in 1783 by *Athan. Cavallon*, and repeated by *Bertholon de Saint-Lazare*, prove nothing respecting lunar light augmenting evaporation; in the same manner I assert that those of *Weitz* made with potash at Lautenberg, prove nothing respecting the lunar rays drawing forth humidity. If in South America and Batavia, they have such a dread of moonlight, I should attribute the pretended pernicious effects said to be produced, more to the humidity of the air, and to the coldness of the nights, than to the effect of any influence of the moon. *Bontius* observed the tetanus to take place at Java most frequently during the night, in the rainy season; and he expressly remarked, that the two terrible diseases so frequent in the East Indies, namely, the cholera morbus and the dysentery, most frequently took place during the rainy months of summer. The celebrated *Reil* observes that sailors have become incapable of supporting day-light from having slept exposed to the light of the moon. I have however never heard from our sailors any complaint of this kind. *M. Reil* also asserts that children sleep less tranquilly when the moon is on the increase. Having had no experience on this subject, I cannot speak decidedly as to the truth of it; but in any case we could explain it without having recourse to the influence of the moon. I should be glad to know if painters have really remarked that the feeble light of the moon has an effect upon their colors, as they have pretended it has.* In a word, experience does not prove any particular influence of the moon's phases upon animal organization; and the theory given by *R. Mead* is absolutely false. I can positively assert that I have always been attentive to this subject, with respect to sick persons, during the long time that I have practised medicine, and that I never perceived any relation between the courses of the moon and my patients, or between their symptoms and the means of effecting cures. Neither have I remarked any influence of the lunar phases, either on diseases caused by worms, or dropsy, tumors, or even on epileptic diseases; I will not, however, deny, contrary to so many ancient observations, but that the moon may have some influence in particular diseases.

Among all the instruments we can employ in order to detect natural agents otherwise imperceptible, the most sensible, as *Laplace* has very properly observed, are the nerves, the sensibility of which is often increased by disease. It is by means of the nerves that some sick persons are able to perceive the influence of the moon in particular situations, that influence being so extremely small.

It may also be this circumstance, perhaps, which has discovered to physicians that there is a relation between the lunar phases and the access of epilepsy and insanity. I dare not decide whether we are to explain in this manner the remarks made by *Diemerbræek* and *Remuzzini*, respecting the pestilential fevers which raged in the years 1636, 1692, 1693 and 1694. It could however be owing to nothing but accident that so many persons affected with fever died during the time of lunar eclipse which happened on the 21st of January, 1693. The influence of the moon upon the crisis of diseases taught by *Galen*, and defended so long in the schools of medicine, is contradicted by experience, at least in Europe; and if *Balfour* be right in asserting that there is a connection between the tides and the access of endemic fevers in India, and that the crisis of fevers happens but at the moment when the luni-solar action begins to decrease, we can only so far agree with him, that this effect only takes place near the sea-coast. In general, we must read those authors who refer so many things to the effects of the moon on diseases, with considerable distrust. It is here, as in many cases of reverie—we only *see* it when we *believe* it. A belief in this influence can only deceive the observer, who, otherwise fond of truth, shares this belief with the sick person; and thus it is that hope and fear excite in the imagination, effects to which the moon does not in any way contribute. Thus also it was in former times. People in general, were afraid of eclipses of the sun and moon, and believed that these phenomena exercised certain pernicious influences over sick persons and persons possessed of weak nerves; now absolutely no sick person perceives the effect, and the physicians pay no attention to it.

* *Note by the French Translator.*—Experiments made at the Royal Observatory at Paris, have proved that the light of the moon, condensed by a very powerful lens, had no effect whatever in altering chemical products, though very sensibly and easily affected by the light of the sun.

EXPERIMENTS IN FEEDING.

From the Transactions of the Highland Society.

Report of Experiments on the comparative advantages of feeding stock with mangel-wurtzel, turnips and potatoes. By Mr. ANDREW HOWDEN, *Lawhead, East Lothian.*

In compliance with your wish, I now send you the results of an experiment which I have been conducting during the past winter, and in which mangel-wurtzel has been used to the extent of two

acres—partly by itself, and more extensively as a mixture with ruta baga and potatoes in feeding cattle. Having been in the practice of cultivating annually from one to three acres of mangel-wurtzel for ten or twelve years past, during which I had read and heard much on the subject of its value, compared with turnips and potatoes, and observing that the Highland Society were making this an object of interest, I resolved to attempt something which would satisfy myself upon the subject which I considered of importance; and with the intention also of communicating to the Highland Society the result of my experiment, should I be able to deduce any thing seemingly useful from it. With this end in view, I set about planting three Scotch acres of good dry, free land, with mangel-wurtzel of the red sort, six pounds to the acre. The land had been previously occupied by a crop of oats after hay, upon which a full dressing of sea-weed was laid. It was deeply ploughed in autumn, and got two spring furrrows, the last across. On the afternoon of the 16th of May, I began planting the seed in the following manner:—The land was ridged in the same way as for turnip, and in the drills were spread from eighteen to twenty tons of good farm yard dung. Immediately upon the dung being covered by the plough, the drill harrow was regulated so that its coulters should leave an open cut of about two and a half inches deep. Into this the seed (which had been steeped in lime water a week before) was put at a foot distance. Much attention ought to be paid to putting in the seed. The length of the drill being measured, the women who are to plant should have equal shares of the distance laid off, the shorter the stretches the better, as a plain roller should instantly follow to close in the earth above the seed, which ought to have been pressed into the bottom of the cut by the thumb of the planter. I repeat, that without strict attention to this, there is much chance of having an unequal braird. It is true the roots transplant like a cabbage, but I prefer the plants found in the seed row at first; indeed a complete justification of this opinion was afforded in the present instance. On the 16th, while the laborers were engaged in the work I attended closely to them, but business calling me from home on the morning of the 17th, I gave strict charge to a confidential man that he should see the work performed with the same precision. Notwithstanding this injunction, there were many more blanks in the one acre planted by him, than were in the two others. Upon these blanks being filled up, the plants put in were watered with about fifteen puncheons from a cess pool into which the washings of the dung-pits run. It was applied in about equal shares two separate afternoons, and a hole having been first made by the dibble near to the plant, it received and retained a quantity of the liquid until it was gradually absorbed. Having so minutely observed upon this part of the process, I shall only mention, that the crop should be ploughed and hoed in a manner very similar to a drilled crop of turnips,—and this is now generally understood throughout Scotland. In this way did I proceed, and with such management the crop was distinguished by uncommon luxuriance.

Seeing about the beginning of August that a good many of the plants were running to seed, I had them drawn and given daily as the food of two bulls which were confined in the house. Towards the end of harvest I began to take off the outside leaves and give them to the milch cows, by which I rather think the growth of the roots was checked. The leaves beginning to fade about the 1st of October, I daily cut completely over a regular portion of them which were given to cows and young sheep promiscuously. On the 2nd of November, I sent a portion of the leaves to be weighed, and the land having been previously measured, I found the weight of leaves per acre, to be 10½ tons. We next proceeded to weigh a portion of the roots, which gave a return of twenty-five tons 1 cwt. The crop was now taken up by the plough, and stored in separate acres with perfect exactness.

But I must here attempt more distinctly to bring into view the object sought for, and the manner of obtaining it, although I am aware that a detail of facts and circumstances, drawn up by one so little accustomed to write as I am, is not likely to be satisfactory. The object sought for by me, then, was the knowledge whether three acres of land produce in beef would be the greatest from a crop of Swedish turnips, of mangel-wurtzel, or of potatoes. To attain this knowledge, I caused a surveyor to lay off five acres of Swedish turnips, two acres of mangel-wurtzel, and two of potatoes. It has been already stated that the mangel-wurtzel produced twenty five tons; and by the same steelyard the weight per acre of Swedish turnips was twenty eight tons; while the produce of potatoes per acre was 73 balls of 4 cwt. each, or fourteen tons twelve cwt: all of which I think very full crops.

The produce being stored in three separate lots, I tied up twenty one cattle of six quarters old, bred by myself, seven of which, designated No. 1, were put to consume one acre of Swedish turnips, one acre of mangel-wurtzel, and one acre of potatoes. [The next seven, (forming lot No. 2) were to consume one acre of potatoes and two of Swedish turnips.*] The remaining seven designated as No. 3, were to consume two acres of Swedish turnips, and one acre of mangel-wurtzel. The whole of the lots were at first allowed a few distiller's grains, and a little straw throughout. I should here remark, that only about one half of the ruta baga was taken up and stored at first; and the whole of the mangel-wurtzel was stored in an untrimmed state.

It is worthy of notice, that the situation to be chosen for storing is of great consequence. I had the mangel-wurtzel intended for the feeding stock put up in separate acres, about forty feet from the feeding shed, which protected the store from the prevailing west wind. The other acre's produce, set apart for the milch cows, was built up in a separate heap, the same width at bottom as the other lots (seven feet;) but from exposure, having only a moderate covering of straw or thatch, the roots upon the west side towards the month of March, lost their juices, and I think their feeding quality. In other years I have seen loss occasioned by too great a body of roots being heaped together, when they fermented and spoiled.

In following out this experiment, I have taken up an opinion, that upon good land, in an early situation, mangel-wurtzel can be grown to advan-

* The sentence in brackets is not in our copy, (for which we are indebted to the Genesee Farmer,) but is required evidently by the context.—*Ed. Farm. Reg.*

tage, and given as a mixture of food in fattening cattle. In its use, a circumstance occurred which I shall mention. In the lot of cattle No. 2, the food of which consisted of Swedish turnips and potatoes, one of the number was often swelled to such a degree, as to make me fear I should lose the animal. Salt and water, oil, &c., were repeatedly used, but by no means with speedy relief. I directed the feeder to introduce among his food four roots of mangel-wurtzel daily. While this was continued the beast never swelled. I withdrew it and the animal became tumefied as before. I again gave back the mangel-wurtzel, and for a month there has been no appearance of swelling. Variety seems gratifying to the appetite of even the inferior animals; and for this reason a mixture of food seems preferable.

The effect in the present case may not be altogether satisfactory, because the cattle taken to show it were not all bred from the same stock.—I must now explain, that on a measurement taken on the 30th of January, I immediately took a pair of cattle out of every seven, and confined them to one particular species of food. To one pair, lot No. 1, I gave potatoes and water, to another pair of lot No. 2, I gave Swedish turnips; and to another pair, of lot No. 3, I gave mangel-wurtzel.—I refer to the tabular statement of the monthly increase of girth, which does not indicate any great superiority; but some good judges say the mixtures have decided preference, and, next to a mixture, the particular food of Swedish turnips is preferable.

So much of fattening, and now for the dairy. I have mentioned that one acre of mangel-wurtzel was put in store for the milch cows, of which I have seven; five of these got a very small quantity to keep them fresh—the other two were allowed as much as they were disposed to eat. This, however, was not the case for the first ten days—as mangel-wurtzel and potatoes ought to be given at first in small quantities, for they both operate too powerfully as a purgative, and the mangel-wurtzel as a diuretic. The two cows put to a full allowance, had calved at midsummer, and were not again in calf. I wished to try if they could be fed and milked at the same time. One of them has been sold fat, and the other, I may say, is fat also—but they had draff along with the mangel-wurtzel. Their produce throughout the time has been four Scotch pints each, per day; this was sold at three pence per pint;* and as I have seen that without draff each cow will produce one shilling's worth of milk for every hundred weight of roots (and perhaps of leaves) consumed in this way, the milk from such a crop would realize £35 per Scotch acre. This to me seems a startling sum—but I give the facts, as I have repeatedly seen the cows milked.

As a summary of this lengthened detail, it seems to me that the food for cattle, whether raised from the land in the shape of Swedish turnips, potatoes or mangel wurtzel, is not materially different, provided crops are alike good of their kind. A less quantity and inferior quality of manure, will produce the potatoes even on land where the soil and climate are not so favorable; but I have ever seen at the end of a rotation, the land upon which potatoes had been grown, in the worst condition, and to obviate this, it is of use, I think, to cultivate a variety which covers well in a drill. This is a subject to which I mean to give my attention this season, seeing the society's premium offered.

I now subjoin a table of the monthly increase of the several lots of cattle, and shall be glad if it is thought to contain any thing in the least useful.

Table of the monthly girth of three lots—each lot consisting of seven beasts.

Date. 1831-2.	Lot No. 1.—Food. 1 acre of potatoes 1 " mangel wurtzel 1 " Swedish turnip	Lot No. 2.—Food. 1 acre of potatoes 2 " Swedish turnip	Lot No. 3.—Food. 1 acr. mangel wurtzel 2 acr. Swedish turnip
Nov. 30.	35 feet 8 inches	35 feet 9 in.	35 feet 8 in.
Dec. 30.	36 " 6 "	36 " 7 in.	36 " 6 in.
Jan'y 30.	38 " 2 "	38 " 4 in.	38 " 2 in.
March 1.	39 " 7 "	39 " 8 in.	39 " 6 in.
" 30.	40 " 8 "	40 " 10 in.	40 " 6 in.
April 30.	41 " 4 "	41 " 7 in.	41 " 3 in.

Twenty eight tons of Swedish turnips and mangel-wurtzel withdrawn, and used for other cattle, having still in store one month's provision for twenty-one cattle.

Girth of Pairs of each of the above lots, put upon different food 30th of January.

Date. 1832.	Lot No. 1. Potatoes.	Lot No. 2. Swed. turnip.	Lot No. 3. mang. wurt.
Jan. 30.	10 feet 8 inc.	10 feet 5 inch.	10 feet 4 inc.
April 30.	11 " 6 inc.	11 " 3 inch.	11 " 2 inc.

The cattle have been sold, and the purchasers agree in opinion, that the lot of seven fed on Swedish turnips are from 7*s.* to 10*s.* a head better than the other lots. The average advance upon the original value of each is £6 12*s.*; and the cost of grain being deducted, there remain £120 in return for the eight acres' produce consumed. I am aware that this is liable to be doubted, in such a year; and the produce is certainly much beyond that of any other part of the lands possessed by me.

It ought to be stated that the mangel-wurtzel was stored in an untrimmed state. When the roots and earth which adhere are taken away, the loss of weight may be greater than I imagined. In hazarding an opinion of the return which it would make in milk, I made no allowance for this.

I am inclined to think, that less attention has been paid to selecting a good kind of mangel-wurtzel than has been bestowed on either turnips or potatoes, as I noticed in the crop under this experiment a very striking disproportion in the weight, two or three roots weighing 10 lbs. or 12 lbs. standing together, while those adjoining could scarcely be said to have roots at all.

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Note by the transcriber.—Mr. HOWDEN has omitted to state the expense of cultivating the different crops. Although I have no correct data to supply the defect, I will state why I consider

* A Scotch pint is equal to four English or American pints.—[*Ed. Far. Reg.*

advantage decidedly in favor of the Swedish turnips. 1. The mangel-wurtzel and potatoes occupy the ground the entire season; the ruta baga does not, but may be grown upon a clover lay, after the grass has been cut. 2. The mangel-wurtzel, being sown in the spring, when vegetation is tardy, does not germinate with the certainty, or grow with the same vigor that ruta baga does when sown at midsummer; and consequently it requires much more labor in hand weeding, and is liable to more vacancies in the drills, than the turnip: and compared with the potato, the turnip is gathered with a fourth of the expense of the potato. Hence the turnip has the advantage of gaining a crop, from the soil, and saving, in my opinion, one half the expense of cultivation. The tops are as abundant and as nutritious as those of the mangel-wurtzel, and the roots may be kept as late as either in the spring. The ruta baga has been considered inferior in product in Pennsylvania and New Jersey, to mangel-wurtzel; but this I ascribe to climate. Here it is, however, a certain and abundant crop, on soils adapted to its culture, and with proper management.—[*Gen. Far.*

YANKEE MANAGEMENT.

From the Portland Advertiser.

Our southern brethren are perplexed to know how it is, that they, with rich land, a warm sun, and staple productions giving an income of from four to twenty per cent., are becoming poor and cashless, while we Yankees are becoming rich, and are having money, if not in abundance, at least as much as is necessary. If they would come among us, and study our economy, the answer would soon strike them. One little instance is no bad example of that Yankee economy and skill that turns all things, even the worst, to advantage.

It may not be generally known that in many parts of our state, our schoolmasters are not only 'boarded round,' so as to save the drawing of the pay of the schoolmaster's board from the school fund—that is, the schoolmaster is boarded a week here, and three days there, according to the number of children—but that the schoolmaster is often 'bid off' or 'put up at auction,' as are our paupers—and the *lowest* bidder in the district takes him, as the *highest* bidder takes an article at a regular auction.

The writer of this article, when preparing to be a college boy, being short of funds, and with no other means of getting money than by keeping school, hired out as schoolmaster for ten dollars a month. This was all the school district could afford to give, as their fund was small; and even with this small sum given, it was necessary to board the schoolmaster as cheap as possible. The school committee therefore called the district together into a new, neat, convenient and comfortable school-house, and in his presence, a scene of this sort took place.

Auctioneer.—'What will you take him for?'

1*st Bidder.*—'One dollar and twenty five cents a week.'

Auctioneer.—'One dollar twenty five, one dollar twenty five.'

2*d. Bidder.*—'One dollar twelve cents and a half.'

3*d. Bidder.*—'One dollar.'

Auctioneer.—'One dollar, who'll take him for less than one dollar? One dollar, one dollar, any body less?—Who speaks?'

4*th Bidder.*—'Seventy five cents.'

5*th Bidder.*—'Seventy cents.'

And thus the bids went on, the auctioneer exclaiming as usual in the mean time, till the schoolmaster was bid off at forty cents per week! Yes, the lowest bidder took him on board for forty cents per week. On going home with this bidder, a sociable, happy man, whose house had more comforts and luxuries than nine-tenths of the houses of the rich planters in the interior of the southern country, and whose table was as good as many sit down at, paying fourteen dollars a week for board, the writer held the following dialogue:

'How on earth can you afford to board me for forty cents a week?'

Ans.—'I make money by it, and have your company in the bargain.'

'How so?'

'Why, you will board with me fourteen weeks. The whole pay for board will be $5 60. My taxes are a little over six dollars. Now, I have bread enough, meat enough, poultry enough, cider enough—in short, enough and more than enough of every thing necessary to eat and drink. I have enough of every thing but money. All I want of money is to pay my taxes. But, in order to raise these six dollars, if I do not get a town order for your board, I must make a journey to Portland or Bath, with three times the produce you will eat, and from all this I find it difficult to raise six dollars in cash. Therefore, I make money by keeping you to eat this produce, and have your company these long winter evenings in the bargain. Thus you see I am interested in boarding you even at forty cents a week.'

Now, we give this to all our southern brethren, as a specimen of the manner in which we Yankees live and thrive. Let them do likewise, and their country will be the richest and happiest on the globe. Here we are shivering in summer, with corn but three inches high to the most, while they are enjoying the blessings of mid-summer, and have corn almost ready for harvest.

From the South Agriculturist.

PRACTICAL OBSERVATIONS ON THE RECLAIMING OF MARSH OR RUSH LAND, PUTTING DOWN TRUNKS IN THESE LANDS AND PREPARING THE LAND FOR THE SEED; *by Q. E. D.*

Mr. Editor,—It is one of those gloomy depressing days, which induce Englishmen to throw themselves into the Thames, and Frenchmen to resort to the gambling table, but as neither of these resources suit my taste, I have determined to kill the day, and not myself, by asking you a question or two, and communicating to you a few facts, the result of my own observation.

How does it happen, sir, that the subjects which head this article, so important in themselves, and so essential to the success of those who begin their agricultural life in new lands, are so seldom noticed and so little understood?

Is there a lack of intelligence among our rice planters which prevents them from communicating to you the result of their experience, or is it an unwillingness that others should profit by their labor?

Is there no new land to be brought under cultivation? or is the subject one of so little importance as not to need elucidation?

It will not be assuming any very great respon-

sibility to answer these questions in the negative. Among no class of our citizens, is there more urbanity and refinement, more talent and information, a less disposition to secrecy and mystery in their avocations; it is needless to add, that there is no scarcity or deficiency of land to be reclaimed. Within a few years, several hundred acres have been subdued and made productive on Cooper river. Mr. Myrick, (on the estate of Col. Harleston,) Mr. Carson and Mr. John Huger, have each added largely to the arable land on that river. Have not the community a claim upon each and every one of these gentlemen for information on this subject? A detailed account of the process by which they have made fertile and productive, lands which were barren and unproductive, will be valuable to their successors, and posterity certainly have some claim upon us to repay in part the obligations imposed by our ancestors. Each of these gentlemen has embanked large quantities of land, and the information they could communicate would be valuable in proportion to the extent of their operations, for errors are more easily detected, and improvements more easily suggested, under these circumstances than when we are limited and confined in our movements.

I have reclaimed two fields, Mr. Editor, and although my experience and information is much more limited than that possessed by the gentlemen already named, yet, I will give you an account of the means adopted, and hope to correct the errors which no doubt I have committed, when others better qualified than myself shall communicate with you on the subject. The first step in the process was, to clean up on the margin of the river, a space about twenty feet wide around the whole field, so that at low water I could walk over the ground, and select the site or foundation upon which the bank was to be raised. To determine upon the spot would not appear difficult, yet upon no point has there been a greater diversity of opinion, than upon the best position for the bank. Our fathers thought a wide margin essential to a good bank; some that the width of the margin gave strength and stability to it; others that it only afforded an ample supply of materials to keep the bank in order after it was made, thus differing as to 'how,' 'why,' or 'wherefore,' but all agreeing as to the fact that wide margins were essential. This theory (for it is nothing more) was in practice carried to a great extreme: thirty acres and more of a plantation of two hundred acres being frequently left in marsh for the purpose of repairing banks.

But, Mr. Editor, our fathers lived in times of large crops and high prices and little expenditure; carriages were not so essential to the wives of those days, and King-street did not present so many attractions to the daughters of those excellent old gentlemen. Necessity has sharpened the wits of their sons, and they (after much reflection and numerous experiments) have determined that narrow margins make tighter banks than wide ones, and that thirty or forty acres of river-swamp is more valuable under bank and ditch, than as receptacles for black-birds and their broods. That banks made near the river are more tight and compact than those erected at a distance from it, is an opinion, daily becoming more prevalent, and the *reasonableness* of the thing is so evident, that we are surprised it should have remained to be discovered in our day and generation.

The rice lands, (I allude to those on Cooper river) are for the most part light, and composed of vegetable matter, which has for ages been accumulating, and is now entirely decayed. The foundation of these lands is clay, but it will take a long course of cultivation to bring us to the foundation, if (as we all believe) the deposits from the river return nearly as much both to the quality and quantity of the soil as is taken from it by culture. So very light are these lands when first reclaimed, that they yield, to the pressure of any considerable weight, and will form hollows or low spots where such pressure is continued. The weight of a river bank, (such as are made on Cooper river) is very great, and place it where you will the earth settles, and the tendency of the water is to lay at the bottom or foundation of it. If this is allowed to continue, both the bank and the foundation upon which it stands becomes sobbed and rotten, and the bank, of course, is liable to all the casualties which necessarily attend weak barriers opposed to strong forces. Under these circumstances, there are many advantages resulting from narrow margins, which will present themselves to the experienced planter. The land is always more firm and strong as you approach the river than as you recede from it, in consequence of the drain which the ebbing of the tide affords that portion of the land. But if the water does accumulate (or pond, to use a plantation phrase) about the base of the bank, it is with great facility drained off. I have heard it urged by those who prefer wide margins, that it is easy to ditch the margin and thus rid ourselves of the evil while we retain the good. If this was true, it would be an answer to my objections only on one point: it would still remain to be proved, that the increased security which the planter enjoys, is such as to compensate him for the abandonment of a sixth or eighth of his rice-land. But it is not easy to ditch a wide margin and keep the ditches open; no man who has attempted it will contradict me, the continual ebb and flow of the tide, the deposits of the river added to the trash always found on the margin, fill up these ditches almost as fast as they can be cleaned, and no attention, (short of the daily use of the spade) will prevent their filling up. I might exemplify this remark in a variety of ways and by numberless instances, but one will be sufficient. Remove a trunk from your river bank, and fill up the gap in the bank, leaving the outside dock open; in a short time deposits commence, and before much time has elapsed, the margin is formed and the excavation is obliterated. But it is useless for me to say more on this subject; it is folly to reason against established facts. Let me not be misunderstood; I speak of banks with narrow margins, not of banks *without margins*, though I do acknowledge that one of the best banks I have ever seen had little or no margin to it.

A margin of ten, fifteen or twenty feet will prove ample for all the purposes of security, and the mud found between this and low water mark, will afford abundant materials for keeping up the banks after it is once made. In addition to all this, we may add, that every field will present irregularities and corners, which (the bank being kept straight) will be left out, and thus add to the means of repairing damages and accidents. Having satisfied myself that a narrow margin is to be preferred and made a careful examination of the site

upon which the bank is to be raised, and placed stakes at a width of twelve feet from each other, around the whole space which had been cleared of marsh, rush, &c. the earth within the range of these sticks, including marsh and rush roots, logs, stumps, &c. to the depth of a foot, was carefully taken out and removed to a distance, leaving me an excavation composed of mud remarkable for its adhesiveness and tenacity. This excavation is a substitute for the "centre ditch," which our predecessors thought so essential to a good bank, and it is found to answer quite as well, and is accomplished with comparatively little labor. Mud from below the margin free from all roots, was now brought, and the excavation made as the bottom of the bank was filled up to a level with the surface of the field. So soon as this was accomplished around the whole tract, the process was repeated and the bank was raised about a foot, which is higher than common tides will rise on new land; a third course of a foot more will put the bank in a safe condition for a time. But new banks settle very much, and it will be necessary to raise them frequently; this was soon evident in my own, and I put down a small temporary trunk to enable the water ro drain and the river ditch to be cut, for from this source the dirt to complete the bank is derived. From the foot of the bank at the distance of thirty feet, I laid out my river ditch five feet wide and four deep, and proceeded to cut it, each man throwing out with ease six hundred square feet of earth, or thirty feet in length of this ditch. The addition of this earth to my bank, put it, (to use a homely expression) out of harm's way, and left me quite at ease on the subject, under all circumstances, and times, and tides.

I omitted to state that in the raising of my bank, two women with a hand-barrow will raise thirty feet of bank in length, one foot high in the tide; at least, this was the task allotted, and it seldom failed to be accomplished.

The field was now laid out in half acres, beginning at one end and proceeding to the other lengthways, and at each half acre a ditch, three feet wide and three deep was cut; the ditch was not included in the half acre, but was purposely excluded from it. This is a convenient mode of laying out the land, as it enables you to apportion the task to the laborer with facility and exactness. The ditches were cut running with the width and not with the length of the field, as land always drains better, the shorter the distance the water has to travel. The earth from these ditches was used to fill up creeks, low places, &c. and the land was now ready for cultivation so far as banks and ditches could prepare it.

But I have occupied so much more of your time and patience, Mr. Editor, on one part of my subject than I had anticipated, that it will be best to postpone what I have to say of trunks, and the preparation of land, for another paper.

I remain your well wisher,

Q. E. D.

CLOVER HAY.

From the Genesee Farmer.

As the season for making clover hay has arrived, we would respectfully recommend, to those who follow the old method of spreading the swath, a fair *trial*, though it be on a small scale, of the method of curing this grass altogether in swath and cock. We can assure those who distrust this practice, that they will not only find in it a manifest saving of labor, but a great improvement in their fodder. And in speaking of clover, we include all grass in which red clover constitutes a third or more of the crop. We will briefly state our process, and then the reasons, which we think, nay, which we *know*, entitle it to a preference over the old method.

The mowers commence cutting, if convenient, when the dew is off the grass, in the morning of a fair day, and may continue till sundown. At two or three P. M. one or more laborers proceed to cock the grass from the swath. For this purpose three swaths are assigned for a row of grass cocks. The grass is collected with the forks, and placed on dry ground, in as small a compass as convenient at the base, say two to three feet in diameter, and to the height of four or five feet, terminating in a cone or point. In good weather all that is cut before twelve, or two o'clock, is fit to put into grass cocks the same day. That which is cut later in the day, may lay in the swath till eleven or two the next day, when it may also be cocked. The grass may stand in these cocks till the third day, when, if the weather is fair, the cocks may be opened at nine or ten, and, when necessary, the hay turned over about midday, and at three or four thrown into piles for the cart. The hay is then made; and there is scarcely a leaf or blossom wasted.

The advantages of this over the old method, are,

1. The labor of spreading from the swath, is saved.

2. The use of the hand rake may be dispensed with, if the horse rake is used to glean the field when the hay is taken off—the forks sufficing to collect it tolerably clean in the cocking process.

3. It is not liable to be seriously injured by rains—for these cocks, if rightly constructed,—(not by rolling) will sustain a rain of several days, that is, they have done this repeatedly, without material injury from heating or becoming wet. And if the grass is in swath, it is too green to sustain damage. Though in the latter case, it is our practice, when wet in the swath, to shake and spread the grass, to free it from the water, and to put it in grass cocks as soon as it will do.

4. The hay made in this way may be almost invariably housed in good condition; and if rains intervene after the grass is cut, its quality is infinitely superior to what it would be under the old process of curing.

The rationale is simply this; to convert grass into hay, it is only necessary to get rid of the surplus moisture, which can only be effected by evaporation. Exposed to a fervid sun the leaves and blossoms of clover dry and crumble to powder ere the stem is sufficiently cured; hence, to preserve the first, which are the finer parts of the hay, all the parts must dry alike. This is effected in the cock; where an equalization of moisture takes place, as in a pile of wetted paper, for the printing press, and where evaporation progresses. The exterior of the stem and the leaves, are partially dried in the swath; and what is called sweating, is merely the passage of the excess of moisture in the suculent stems, to restore the equilibrium to the surface. When this has taken place, evaporation is greatly facilitated on exposure to the sun and winds.

Too long an exposure, when the cocks are

opened, should be guarded against. The drying process is continued after the hay is gathered for the cart, and until it is deposited in the barn.

FINE STOCK.

The public are under many obligations to Mr. Corbin Warwick of this city for his several exertions, to improve the breed of our stock. Exclusive of the cattle and sheep, which he purchased at Mr. Meade's sale in Frederick, he has just received from England by the Lady Anne Eliis at Norfolk—two bulls and a cow, of the best British breeds. The bulls are yearlings, and noble looking animals they are of that age—one is the short-horned, Durham stock, roan color, excellent for the dairy and for beef. The other is of the Hereford breed, fitted for the draft as well as for beef. The latter is larger with a remarkable dewlap and breast, and big head with his curling hair, red with white face, &c. The heifer is a two year old, a beautiful creature of the Durham stock—and she is already with calf—she was bulled on the 21st October last, by Maggot of famous lineage—his pedigrees are before us prepared by the Rev. Henry Berry—and one of the dams was a 14 quart cow. In truth, Mr. W. has been supplied with the genealogy of all the cattle*—and it appears they are all of the best blood. They arrived in this city in the Patrick Henry on Thursday night—and will be removed to his farm on the James River. When we consider the high reputation, which the Durham and the Hereford breeds bear—and the great expense of bringing them to this country—the three estimated at near $2000, we cannot but offer our thanks to Mr. W. for the enterprising spirit which he displays in these attempts to improve our stock.—[*Richmond Enquirer, July* 2.

VEGETABLE PHYSIOLOGY.

Extract from the Foreign Quarterly Review, for 1833.

First period of nutrition.—This comprises the introduction of the food into the plant. As vegetables do not possess the power of locomotion, it is necessary that their food should be so generally diffused in nature, that they shall run no risk of perishing from their inability to search for it. Now it is a fundamental principle in vegetable physiology, that every thing capable of being imbibed into the tissue must previously be brought to a state of solution; but water is present every where in the earth, and in the atmosphere, and the material which constitutes the chief food of plants is carbonic acid, which is almost constantly to be found dissolved in all water. The root is the only true absorbing organ of this nourishment; for although, under certain circumstances, the leaf and some other organs may be made to absorb moisture, these are not to be considered as the organs originally destined for the introduction of food, any more than the pores in the skin of animals, which possess a like property, may be considered as their mouths. Neither is it by the whole surface of the root that this absorption takes place, but only through the "spongioles," which are small expansions of cellular tissue situated at their extremities. It is not clearly ascertained, whether the force which regulates the absorption of the spongioles is wholly vital, or whether it is the result of a vital action, in combination with the hygroscopic property of the cellular tissue. De Candolle had formerly attributed this action of the spongioles to their hygroscopicity alone; but he is now disposed to consider it dependent, to some extent at least, on the vital force. It does not, however, appear, that because there is a cessation of this absorption in the dead plant, and a continuance of it only in the living one, that we must therefore conclude it to be the result of a vital action in the spongioles themselves; for if it were really due to their hygroscopic property only, still the immediate removal of the absorbed fluid, by the organs which cause its progression through the plant, would continually renew the conditions necessary to secure a momentary repetition of its action. This absorption also has more of the aspect of a mechanical than of a vital operation, from the circumstance of all plants being equally indifferent as to the quality of the solutions which they imbibe, the quantity being regulated chiefly by the state of liquidity in which they occur; a more liquid solution of some substances, deleterious to the health of the individual, being more readily imbibed by it than others which are more viscous, though composed entirely of materials which are highly nutritious.

From the great uniformity in the means employed for absorbing them, and the general similarity of the matters absorbed, arises a great resemblance between the nutritive apparatus of all vegetables; which makes these organs ill adapted to the purposes of classification, and compels us to search among the reproductive organs for the characteristics necessary to establish a scientific arrangement of plants.

The usual aliment of plants we have stated to be water, containing carbonic acid in solution, or, we may add, at least containing some proportion of animal or vegetable matter capable of being converted into carbonic acid. But, besides this, air and various salts and other matters are absorbed in solution. Where, however, more substances have been found in the ashes of plants, than were supposed to have composed the materials by which they had been nourished, we must not conclude that the plants have created these substances, as some have imagined, but must consider them to have been extracted little by little, from some medium in which they really existed, though in such minute quantity as to be incapable of being detected by chemical tests. We may easily allow that plants surpass us in their powers of abstracting the minutest portions of any material disseminated through a given menstruum.

Second period of nutrition.—The water introduced by the absorption of the spongioles is called "sap, or lymph." It is then conveyed directly to the leaves, without sustaining any appreciable change in its progress, otherwise than by mixing with the vegetable juices it meets with in its course. The particular route which the ascending sap takes has often been a matter of discussion and dispute; but it has been clearly ascertained, by repeated experiments, that it ascends along that portion of the cellular tissue which constitutes the woody fibre, and not through the vascular tissue, which is intended primarily for the conveyance of air, though its tubes may occasionally be found filled with fluid. With respect, however, to the mode in which the sap is conducted along this cellular tissue, there is still much uncertainty. De Candolle favors the hypothesis of its passing along the inter-

* For which, see No. 2 Farmers' Register, p. 127-8.

cellular passages, as we before mentioned, by means of the successive contractions and dilatations of the cells themselves. But we decidedly consider the newly established principle of endosmose to afford a much better prospect of accounting for the fact. Endosmose is that property of all membranaceous substances, by which two opposite currents are established through their texture, whenever two fluids of unequal densities are placed on opposite sides of them. That the vital force must also be employed in securing any lengthened continuance of this action, is evident; for in every apparatus constructed for the purposes of experiment, the effect must cease as soon as the two fluids have acquired the same density. Now, without attempting to account for the manner in which the healthy condition of the membrane is secured, we may easily imagine the constant developement of fresh vesicles, and the continued secretion of fresh materials to be sufficient to maintain the conditions necessary for the establishment of a perpetual endosmose during the lifetime of the plant, without considering this property itself to be directly dependent on the vital force. This property also explains the prodigious force with which the sap rises in certain seasons of the year; a force sufficient, as Hales determined, to support a pressure equal to two atmospheres and a half, and five times that by which the blood is propelled in the crural artery of the horse. The ascent of the sap is the result of a compound action, partly depending on a force "a tergo" propelling it forward, and partly on a force attracting it towards the foliaceous parts of the leaf, each, however, resulting from the endosmose carried on by all parts of the cellular texture.

Third period of nutrition.—When the sap has arrived at the leaves, and at the other green parts on the surface of the plant, a considerable portion of its aqueous particles is transpired. A cabbage, for example, transpires from a given surface seventeen times as much as a man by his insensible perspiration. A small portion indeed, of this effect must be ascribed to the process of evaporation; but this is comparatively very trifling, and the greater part must be attributed to the action of a vital function. This is so decidedly remarkable in the vegetable kingdom, that De Candolle proposes for it the name of "exhalation," in order to distinguish it from the less conspicious effects of the insensible perspiration of animals. It is manifestly produced by the instrumentality of the stomata, or glandular pores, seated on the green parts of plants, and which are more especially abundant on the under surface of the leaf. Heat exerts a trifling influence in producing an increase of exhalation, but light is the chief stimulant which determines its extent. Plants do not exhale moisture in the dark, and as they still continue to absorb a little, they soon become dropsical. The fluid exhaled is nearly pure water, and consequently the sap must become considerably altered by this circumstance alone, as the materials introduced in solution will now bear a higher proportion to the whole quantity of water retained in the plant. This great exhalation of the superabundant fluid may be considered analogous to the combined effects produced both by the insensible prespiration and excrementitial rejections of animals.

Fourth period of nutrition.—We have now arrived at the complicated phenomenon of vegetable "respiration," the most important of all the processes which together constitute the function of nutrition. One circumstance in this process is strictly in accordance with what takes place in the respiration of animals; the presence of oxygen being equally essential to the life of the individuals of each kingdom, though the ultimate results are diametrically opposite in each. In animals, the oxygen inhaled unites with the superfluous carbon in the blood and the carbonic acid thus formed is exhaled in the atmosphere. In plants, a similar effect takes place by night; when the leaves and other green parts inhale the atmosphere, whose oxygen unites with the carbonaceous matters dissolved in the sap; but the carbonic acid thus generated is, for the most part, retained in solution within the plant, and not exhaled again. All the colored parts of plants perform this function as well by day as by night; but the green parts always decompose carbonic acid by day, from whatever source they may be able to derive it; and the result of this decomposition is to fix the whole of the carbon, and a small portion of the oxygen, in the substance of the plant, and to exhale the rest of the oxygen into the air. The chief supply of carbonic acid provided for this purpose is that which is introduced by the roots in a state of solution; but the small quantity universally present in the atmosphere is also inhaled and decomposed by the leaves. That which is formed within the plant itself is either retained in solution, or it is exhaled and disseminated in the atmosphere, whence it may re-enter the plant by one or other of the two methods just specified. Although the decomposition of carbonic acid is always proceeding during the day, yet it is never so rapid, nor so decidedly appreciable, as when the plant is exposed to the direct rays of the sun. It is independent of the presence of the stomata, which we have already described as being the true exhaling organs of the green parts; and it is certainly effected by means of the cellular texture of these same parts, whose green tint must be ascribed to the result of this very action. There can be no question that the "decomposition" of the carbonic acid is the direct operation of a vital function; but the "formation" of this gas in the colored parts of plants, at all times, and in the green parts by night, appear to be the result of a chemical action similar to the ordinary process of decomposition in all dead organized matter. If a plant be exposed to the light in an atmosphere deprived of oxygen, it soon dies, unless (which is very remarkable) it be enabled first to form a little oxygen by decomposing some portion of the carbonic acid within it, and thus to impregnate the atmosphere with a sufficient quantity to enable it to act as a further resource and constant stimulus for the formation and decomposition of fresh supplies of carbonic acid.

The result of all these compositions and decompositions of carbonic acid in the living plant is the fixation of the whole of that carbon which is found in the entire mass of vegetation on the surface of the earth. Thus the atmosphere is continually being purified of every fresh addition of this material with which combustion, respiration, and putrefaction are perpetually adulterating it.—For though all living plants do themselves generate carbonic acid in the way which we have specified, they also decompose much more than they form and this access is considered to be sufficient

to counterbalance the quantity introduced into the atmosphere by other causes. In this single function, then, of vegetable life, we see an efficient yet simple means of restoring to the atmosphere that proportion of oxygen which is necessary to the health and existence of organized beings.—Thus, the consideration of the humble functions of vegetable life may serve to elevate our thoughts in wonder at that universal order which prevails throughout the works of the great Creator and Preserver of all things.

Fifth period of nutrition.—This period comprises the return of the newly elaborated sap into the system. The course which it pursues in its altered condition is, for the most part, down the innermost layers of the bark; as several very satisfactory experiments have decided. In the process of "ringing," which consists in stripping a branch of a circular rim of bark, the descending sap is stopped, and a swelling is formed at the superior edge of the ring. The alburnum, or soft wood immediately below the bark, will also, if properly protected, serve to convey a portion of the descending sap, which is then further elaborated, and the alburnum hardens to solid wood.—It has been a subject of considerable controversy, whether the new layers of wood and bark have resulted from the developement of the old tissues nourished by the descending sap, or whether they have been generated partly in this way, and are partly formed of fibres descending from the buds which are seated on all parts of the stems and branches. Perhaps the question ought not to be considered as finally settled; but certainly we agree with our author in considering the latter opinion, of the descent of the fibres, as one which is little supported by facts, or by analogy, and that it rests for the present entirely upon vague conjecture and hypothetical reasoning. The elaborated sap descends to the roots, and causes their further developement, whilst a portion of it is intercepted by the rising sap by which it is conveyed to the buds on the stem. There is, in fact, no true circulation in plants; but a portion of the elaborated sap, in its descent towards the roots, becomes mixed with the ascending sap, and is thus conveyed to all parts of the system.

Sixth period of nutrition.—In detailing the fourth period, we accounted for one alteration in the condition of the sap, by the circumstance of a considerable exhalation of its aqueous particles taking place, and for another, by its having received an addition of carbon from the decomposition of carbonic acid in the green parts. The nutritious material thus formed is essentially composed of carbon, and the two elementary ingredients of water, viz. oxygen and hydrogen. There are, however, several vegetable products, differing materially in their sensible qualities, which are composed of these three elementary substances only, and it is a task of some delicacy to select that particular one from among them, which may most reasonably be considered as the universal pabulum prepared for the nourishment of the different vegetable tissues. Our author considers "gum" to be the simplest combination of the three elementary ingredients mentioned; and argues, from its universal prevalence, that it must be the true nutritious principle of vegetables. There are some other substances nearly allied to gum in their chemical composition, which appear to be slight modifications of it, effected in some after process, by the secreting powers of the cellular tissue. The preparation of these fresh substances constitutes our sixth period. They seem to serve some purpose connected with the nutrition of the plant; but what this may be, it is impossible in the present state of our knowledge, to decide. Three of these substances are fecula, sugar and lignine, each differing very little from gum in their chemical composition. If we consider the solution of gum, so constantly found in the sap of plants, as analogous to blood, the formation of these other materials may then be likened to certain local secretions in the animal kingdom. Each grain of "fecula" appears to be a reservoir of gum incased in an insoluble integument. It is diffused through various parts of the plant, serving as so many magazines of nutriment for the future developement of its several organs. It bears a striking analogy to the fat of animals. "Sugar" bears a strong resemblance both to gum and fecula in its composition. It is found in a liquid state in the cells, and is probably intended to serve some purpose or other of nutrition. "Lignine" is insoluble in water, and is a secretion deposited in the cells, which compose the woody portions of the plant.

Seventh period of nutrition.—The three substances mentioned under the sixth period, appear to be destined to serve some purpose or other of nutrition, as well as that universal pabulum "gum," of which they are only slight modifications. Besides these, there are many other substances which result from the specific action of distinct parts of the vegetable structure, and which bear a still closer analogy to the peculiar products secreted from the blood of animals by the action of particular glands. In animals, however, the glands destined for this purpose are very conspicuous, the ducts through which the secreted matter is conveyed being clearly defined, and the secretions themselves presented to us in an isolated form.—But in plants, the glands are generally minute, their structure scarcely distinguishable, and many of their secretions so much blended with other materials, that it requires a chemical process to separate them.

The enumeration of these various substances occupies a considerable portion of the first volume; and an attempt is made to classify them under a few general heads; but as no light is thus thrown upon the function of secretion, we shall allude very briefly to these details. Every separate vesicle of the cellular tissue may be considered as a secreting organ, and some of them appear to elaborate peculiar compounds without assuming any of the ordinary characters of distinct glands. In other cases a glandular structure is clearly distinguishable from the rest of the tissue. This matter elaborated is either destined to appear on the outside as an excretion, or it remains within the plant, but is so arranged in separate cavities as not to intermix with the nutritive juices. These all differ from those other secretions which we have considered as eminently nutritive, by having their oxygen and hydrogen in a different proportion from that in which they exist in water; and hence it seems probable that they result from a later and more complicated process than that which produces the nutritive secretions belonging to the former period. They all moreover act as poisons when imbibed by the roots; and this again shows us

that in the living subject they must necessarily be contained in specific cells provided for their reception, and that they can form no part in the process of nourishing and developing the plant. There are certain local secretions which can only be separated from the general admixtures in the sap by chemical processes; such are the various vegetable acids and alkalies, the origin of which is not at all understood. In the ashes of plants also we find variable quantities of different earths, metals and salts, all of which have been introduced in solution with the water absorbed by the roots. A supposition which has been made, that some of these materials may be the direct produce of an effort of vegetable life, is wholly untenable, and their presence is clearly to be accounted for on the principle of their absorption in a state of solution. It is a more delicate question to determine, whether these materials ought to be considered as merely adventitious, and unnecessary to the health of the plant, or whether their presence is really beneficial to it. When received into the system, they are conveyed by the sap to the leaves and surface of the stem, where they are always found to be deposited in greater abundance than in any other parts of the plant; which arises from the constant exhalation of the water in which they were dissolved taking place there. Hence, the annual fall of the leaf secures a constant discharge of these earthy matters from the plant, and a renewal of those organs takes place, which otherwise must ultimately have become choked by them.

Having completed the account of the various processes into which the great function of nutrition may be separated, some account is given of the progress made in the annual growth of a plant during each of the four seasons.

In "winter" the vital action remains nearly torpid. A continued but feeble absorption takes place at the root, sufficient merely to supply the slight degree of exhalation still carried on by some of the organs seated towards the surface. In "spring," the increased temperature is the great stimulant to the vital excitability, and the bark now begins to attract the sap towards it, and a fresh current proceeds from the roots. The formation of new radicles and spongioles adds increased vigor to this flow of the sap, and the immediate consequence is, the developement of the buds. Independently, however, of these stimulating causes by which the vital energies of the plant are roused to action at the return of spring, it should seem that there is a special law of vitality, predisposing the plant to make these efforts after certain periodic intervals. Their success also depends, in a great measure, upon the conditions under which the plant has been placed during the previous year. During the "summer," the function of nutrition gradually diminishes in the intensity of its action. By the "autumn," the leaves have become choked by the earthy particles deposited in them; their fall commences, and the true sleep of the individual takes place. This, as is well known, is the best season for transplanting, when the juices are stationary, and the new fibrils have not yet been developed on the roots.

In explaining the mode in which the young branches and roots are developed, it is to be noticed that the former expand throughout their whole length, while the latter are increased by successive additions at their extremities only. During the process of developement, something like periodic returns of intensity has been remarked, and it is stated that these efforts are twice accelerated and twice retarded every day, but the account wants confirmation.

OBSERVATIONS ON CURING CORN AND FEEDING OF CATTLE; *by B. Nicolau.*

[During our excursion into Georgia we several times heard of the excellent management of Mr. Nicolau, and it would have afforded us much pleasure to have called on him. Our time did not permit, and we asked the favor of Mr. Couper to request him to become a contributor to the Agriculturist, and the following has been politely furnished in pursuance of this request. We regret, that he should have thought that his practice so much resembled that of others, as not to require particular notice; with due deference we think otherwise. The practice of any planter who renders his old fields as profitable as his new, must be worthy of particular notice, and we still hope Mr. Nicolau will do us the favor of communicating it in detail].—*Ed. So. Agr.*

Hopeton, April 17, 1833.

DEAR SIR,—The accompanying statement has just been handed to me by Mr. Bernard Nicolau, who resides in the Buffalo, in reply to my request, that he would furnish you an account of his system of planting. He thinks his practice, except in the greater use of the plough and a greater attention to manuring, so much like that generally adopted by others as not to require any particular notice. He conceives that he has derived important advantages from pursuing the mode of cutting his corn and penning his cattle, which forms the subject of his paper. I can adduce my own experience in favor of the penning system. The subject is not new; but its successful application by a practical man and a good planter, may recommend it to an insertion in your journal. Mr. Nicolau is a French gentleman, who presents one of the best specimens of a good agriculturist that this section of the country offers: and has done much with very limited means. He has accomplished what is still more rare, in rendering by a judicious system of manuring and rotation of crops, his old lands as profitable as his new.

With great esteem and respect, I am dear sir, your obedient servant,

J. HAMILTON COUPER.

Notes on fodder and cattle.

FODDER.—The greatest difficulty for farming in this part of Georgia is the procuring of fodder. The only source of it that I have as yet discovered, is Indian corn, and when managed as I have learned to do, by the information obtained from "Taylor's Arator," and the third volume of the "American Farmer," it yields a great deal of it, not only for horses which are too nice to eat any part of it but the *grain* and *blades*, but for oxen and cows, which eat all the tops and shucks. For several years I have tried to save both in the *common way* with no success, and it is only since I have followed the plan laid out by the farmers of Virginia, that I have attained my object, viz. to have fodder enough to support thirty head of grown cattle for two months in the fall (September and October,) with thirty acres of corn. My manner of saving it is this.

When the corn is past what is called mutton corn, or when I have saved the blades up to the ear of corn, I proceed to cut the stalk. Two hands with their hoes, cut first two rows, in the middle of a half task (which are the fifth and sixth of it, if there are twenty rows in a task) these hands continue to cut it down the whole length of the field, be it more or less. Then they return in the same way in the other half of the task, until all the field is gone through—four or more hands follow these two; picking up the stalks of corn and carrying them to a place where four stacks of corn have been tied together to make a heap. In the length of one task, there are two stacks for ten rows, and four heaps are made in each task. It is not necessary to bind the whole stack round. It will stand well if made right. After a week or ten days, I move the heaps; and of two I make one, so that the inside becomes the outside, and the whole dries well and very few ears are spoiled. When I think that the corn is dry enough, I shuck it on the ground and put up the heaps again, making one out of two, so that a single heap of fodder remains in each task; such fodder will keep well the whole winter and will serve for the working oxen till May.

CATTLE.—Keeping the cattle the whole year in pens, has been my aim since I have known the necessity of making manure. I have succeeded in that plan, in this manner: from May to August, my cattle are turned out to live on the green grass of the woods, and penned at night; and from September to April are kept in a close pen, or in my field, and always penned at night. My pen is square with one side of it covered; all the grown cattle are fastened by their necks at three or four feet distance from each other, by two upright poles, one of which moves on a pin, and when the oxen or cows have put their heads between the two poles, the moveable one is fixed by a pin. Every night fresh litter is put under them, and they are fed from September to October with my corn tops and shucks, cured as I have said above, and besides with potatoes, vines or peas pulled up root and all; in November and December with sugar-cane tops, and then, when the cotton is done picking they are turned into the field and fed at night with cotton seed, at the rate of two quarts each. I have found that eight acres of corn will support thirty head of cattle for sixteen days, and one acre of cane tops will go as far as these eight acres of corn. In my pen there is a well and a large trough to water the cattle. The young calves are kept in a separate pen.

PUBLIC WORKS FOR FACILITATING TRANSPORTATION.

ADVANTAGES AND ESTIMATED COST OF THE PORTSMOUTH AND ROANOKE RAIL ROAD.

Extracted from the Report of C. Crozet, Engineer.

RICHMOND, Oct. 8th, 1832.

To the President and Directors of the Portsmouth and Roanoke Rail Road Company.

GENTLEMEN:—In compliance with your wishes and instructions, such surveys were made between Portsmouth and Suffolk as enable me to establish the outlines of the location and graduation of the rail road between these two places. This forms the first section of the entire line from Portsmouth to the Roanoke; it is also that on which, owing to the proximity of the Dismal Swamp, the greatest difficulties of execution were apprehended. Indeed, I had heard opinions expressed calculated to discourage the scheme; that a rail road would be found next to impracticable, on account of the intervening swamps; but I am happy to have it in my power to state that, on the contrary, so slight are the difficulties, that the expectations of the most sanguine will even be exceeded by the result. —Although the surveys were carried at this time but a short distance beyond Suffolk, I am firmly convinced, from my previous knowledge of the country, that the few natural impediments encountered will appear much less than are commonly met with on the track of other rail roads.

In the first place, as regards graduation, a former survey has informed me that the dividing ridge, between the waters of Nansemond and Black-Water rivers, is only 82 feet above tide: and as our operations have already attained an elevation of nearly 60 feet, and the distance is yet several miles to the top, this ridge may be considered as surmounted.

The crossing of the three tributaries of the Chowan, (which perhaps may be reduced to two,) constitutes the next and principal obstacle; but here again the small elevation of the country, and the distance for graduating, sufficiently warrant that the descent to the streams and their crossings will be effected with even less than ordinary difficulty.

From the Chowan to the Roanoke, the country is likewise low and even, and the expense of graduation upon a judiciously located line, will be small.

In the next place, the character of the soil which formed the subject of reasonable apprehensions, proves rather favorable; it possesses a great degree of firmness, being a mixture of sand and clay, which, in most places, will harden in wet weather and form at all times as good a foundation as can be expected from earth alone. There can be no hesitation, therefore, in adopting the conclusion, that the rail-road can be very advantageously located for the favorable application of the swift locomotive power, to which, since its late improvements, rail-roads owe their undeniable superiority wherever gravity has but a small share in the resistence, as will be the case here.

After having asserted the striking practicability of the undertaking, it is almost idle to say any thing further in regard to its expediency, since it turned, as I conceive, solely upon the condition of its feasibility. For it will readily appear that, along so remarkably level a rail-road, whether Weldon or any other point be selected for its termination, a few hours will bring to Portsmouth, in sight of the ocean, what now requires frequently more than as many days. Activity is the life of trade, and the easy intercourse thus established between one of the best seaports in the union and a vast extent of country, cannot fail to impart to both, a new existence. The valley of the Roanoke and the country bordering on the Chowan, and branches, depend, by their geographical situation, on Norfolk for a market, and will readily avail themselves of the eminently superior advantages which will be offered to them in this direction. And as regards travelling, all that which descends the Chesapeake will certainly take this course towards the southern states and vice versa. A glance at the map will suffice to establish the cor-

rectness of these views. An extensive and fertile country at one extremety, an excellent seaport at the other, a rapid transit between them, render success certain and promise a fair return for the undertaking.

Nothing but the existence of numerous other improvements can have prevented the overflowing of the books of subscription, but of these, the navigation of the Sound and Dismal Swamp Canal is the only one from which it might not be unreasonable to apprehend a competition; and yet, if the peculiar circumstances which now influence the commerce of Norfolk, be considered, it would not be difficult, I think, to show that the navigation and this work do not conflict with each other, but will rather unite hand in hand in promoting the welfare and rise of the two sister towns.

It would, therefore, be irrelevant to trouble you with an inquiry into the trite and sometimes absurd, if not unfair, comparisons which prejudice has frequently drawn between navigation and transportation by rail-roads; each has its advantages, which, in this case, will be made to contribute to the support of the same cause and interest.

The celerity of speculation and travelling will recommend the rail-road, while the proximity of navigation, and sometimes its economy, will favor the Sound. This double facility will prevent divergency, and, by drawing the trade into the same channel, will impart to it a greater activity, and thus production, business and capital will increase and be concentrated upon the same point; without the rail-road, this result is more than doubtful; it should consequently be viewed, I think, as an indispensable accessary to the navigation.

It would be difficult, at present, to reduce these speculations to numbers; but this much can be said, that if the rail-road is to cost $450,000, (which I do not think far from the truth,) a fair return would require it to produce $36.000 annually, to cover all expenses, exclusive of those attending transportation. This amount is certainly incommensurate with the importance and influence of situation of such a seaport, to which this would be one of the main avenues, to say nothing of the amount at which the increase of business might be valued.

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COST.

As regards the cost of the road, it is obvious that in a neighborhood, where such works have never been made, some uncertainty must exist concerning the effect of a new undertaking upon the price of labor in the ordinary state of things. Consequently present prices alone would not be a safe criterion, and the following estimate has been predicated upon the existing prices, modified by those of the nearest work of the kind, the Petersburg rail-road. The estimate has besides, been made for the uniform plan above described; and as the modifications that may be introduced, by the use of the timber found on the spot, will be a saving to the company, the estimated cost below may be considered a maximum.

SUPERSTRUCTURE PER MILE.

2,640 pieces of scantling	*a* 12 cents,		$316 80
2,640 blocks,	-	8 do.	211 20
2,640 wedges,	-	4 do.	105 60
splicing plates,	-		50 00
iron spikes,	-	-	70 00
660 ties	-	-	99 00
string pieces, 6 by 8 inches,	-		633 60
stakes	-	-	13 20
iron, 22 tons,	-	-	1,100 00
laying and dressing,		-	960 00
turn out,	-	-	200 00
Total per mile,	-	-	$3,759 40
and for 16 miles 5,106 feet,			$63,786 00

In some places, the cost of the superstructure is enhanced by the necessary adoption of a more expensive plan than the above. For the sake of brevity and uniformity, the difference has been introduced at each particular place, in the estimate of formation of the road which follows:

GRADUATION AND FORMATION.

	Distances.	*Cost.*
1st stage from Chestnut St.	2 miles 140 feet	$1,152
2d - -	3 " 2160 "	2,514
3d - -	0 " 4600 "	691
4th - -	2 " 724 "	2,806
5th - -	1 " 2747 "	672
6th - -	1 " 4911 "	1,090
7th - -	1 " 2740 "	2,881
8th - -	0 " 4690 "	878
9th - -	1 " 394 "	2,220
10th - -	1 " 3234 "	3,663
Total amount,	16ms. 5,220 ft.	$18,567
Deduct for error in middle line,	114* abt,	*23
Leaving -	16ms. 5,106 and	$18,544
To which adding for superstructure,		$63,786
And for contingencies, superintendence, &c. on both, 10 per cent. - -		8,233
The whole estimate will amount to		$90,563
Which is per mile,		$5,337 and a fraction.

In this estimate no mention is made of clearing and grubbing, because the timber obtained, probably, will be a full compensation for them by its ready use in a work of this sort.

I regret that it will not be in my power to witness the progress of this important work. I shall, however, direct frequently my inquiries towards it, with a solictitude I have felt from the beginning, but which has received additional intensity from the confidence and kindness which I have been favored with by the company, and for which, I beg you, gentleman, to receive collectively and individually, my most grateful acknowledgments.

I have the honor to be, respectfully,

Your most obedient servant,

C. CROZET, *Engineer.*

UNDULATING RAILWAY.

From the Athenæum.

This contrivance, which we have already cursorily noticed, has occasioned some discussion among scientific and practical men; but it does not appear that any explanation of its effects has been suggested. Indeed, we are inclined to think, that the patentees themselves are not fully aware of the physical principle on which the advantage which they have undoubtedly gained, depends.

* These amounts are introduced here merely to prevent embarrassing discrepancies in the calculation: they would otherwise be too small to be noticed.

The problem is one, the full illustration and developement of which would require the language and symbols of mathematical physics; some notion of it may, however, be conveyed in such a manner as to be intelligible to the general reader. We shall first state what it is that the undulating railway performs, in which the level railway fails; and we shall next explain the physical law on which this depends.

Hitherto, it has been received as a practical axiom, that railways can only be advantageously applied between points where a uniform dead level can be obtained. Now the patentees of the undulating railway maintain a proposition which is the logical contradictory of this. They hold, that even if the projected line be naturally a dead level, it must be artificially cut into ups and downs, so as to keep the load constantly ascending and descending until the journey is completed; and in so doing, they assert that the transport is produced in a considerably less time with the same moving power, or in the same time with a much less expenditure of the moving principle. Again, it has been held as a practical axiom, that if on a railway it becomes necessary to ascend from one level to another the ascent is most advantageously made by a plane uniformly inclined from the lower to the higher level. On the contrary, the patentees of the undulating railway hold that the ascent is effected with a lesser power, by dividing the interval into ups and downs, so as to cause the carriage alternately to descend and ascend until it arrives at the upper level. Indeed, one of these propositions follows from the other, for if a greater momentum is generated in going from one point to another of the *same level*, by undulation in the railway, that *excess of momentum* will carry the load to a *greater height* than the momentum which the *same power* would generate on a *level railway*.

These facts have been illustrated by a small model on a wooden railway in the Adelaide street exhibition-room. We have ourselves at that place instituted the following experiments, with the results here detailed. The moving power was a spiral main spring regulated by a fusee: a load was placed on a level railway of such an amount that the moving power was barely able to overcome the friction but incapable of moving the load. In this state the carriage and load were transferred to the undulating railway, and the same moving power impelled the load with ease and with considerable velocity from one end to the other; and lest any difference of level should exist between the extremities, we caused the same experiment to be made in the contrary direction, which was attended with precisely the same result. Hence it was evident that, at least with the model, a power incapable of transferring the load between two points at a given distance on a level railway, transferred the same load with facility and despatch through the same distance on the undulating railway.

Our second experiment was as follows:—We loaded the carriage in the same manner on the level railway, so that the power was barely equal to the friction, but incapable of moving the load. We then transferred the power and load to a railway, the remote extremity of which rose above the nearer extremity at the rate of one inch in eight feet. The power which was thus utterly incapable of moving the load on the level, easily transferred the same load from end to end of the undulating railway, and at the same time actually raised it through one perpendicular inch for every ninety-six inches of its progress along the horizontal line.

Among the scientific men who have witnessed this exhibition, many, it is said, have declared, what indeed appears at first to be the case, that the result is contrary to the established principles of mechanics. We do not perceive, however, any difficulty in the phenomenon.

The effective impelling power when a load is tracked upon a railway, must be estimated by the exesss of the actual impelling power above the friction. Now, it is well known that the friction, being proportional to the pressure, is *less on an inclined than on a horizontal railway*. The same impelling power which on the level railway is *only equal to the friction*, and therefore incapable of accelerating the load, becomes effective on the inclined railway, where *it is greater than the friction*. The excess therefore becomes a means of generating velocity, so that when the load arrives at the extremity of the undulating line, a quantity of velocity has been communicated to it, which is proportioned to the excess of the friction on the undulating above the friction on the level line. This is, theoretically speaking, a decided and undeniable advantage which the inclined railway possesses over the level. We could make this point still more clear, if we were addressing mathematical readers.

Now, if it be admitted that at the extremity of the undulating line, a velocity is generated in the moving body much greater than any which could be produced by the same power acting on the level line, it will follow demonstratively that this velocity will be sufficient to carry the load up a certain height, bearing a fixed proportion to the velocity itself; and hence it will be perceived that a moving power, which is incapable of moving the load on a dead level, will be capable not only of moving it between the extremities of an undulating line when at the same level, but even of raising it to a higher level.

But the practical application of this principle seems to promise still greater advantages. In the above reasoning, we have assumed that the impelling power acts with a uniform energy in accelerating the motion of the load. This, however, is not the case when steam power is applied: the load soon attains the maximum velocity, and the engine becomes incapable of supplying steam fast enough to produce effective pressure on the piston. The cylinder, in this case, receives steam from the boiler only at the same rate as it is discharged by the motion of the piston, and scarcely any direct effect is produced by its pressure on the piston. In the undulating railway, the working of the engine will be suspended during each descent, and a part of the succeeding ascent. In this interval the steam will be *nursed* and accumulated so as to be applied with its utmost possible energy the moment the velocity on the brow of the hill begins to decline. When the load surmounts the summit, and begins to descend the next hill, the operation of the engine will be again suspended, and its powers reserved, and accumulated for the next ascent. The duty of the engine will thus be, not to produce steam constantly at a great rate, but to produce steam of excessive energy for short and distant periods. Every one who knows the prac-

tical working of high pressure engines, will see the advantage likely to result from this circumstance.

When the line connecting two points at the same level is thus resolved into curves, the motion of the engine may not inaptly be compared to that of *a pendulum*, and the moving principle stand in the place of the *maintaining power*, the functions of which are the same precisely as those which it discharges.

On the other hand, it is right to consider the practical objections to this projected improvement. The very small amount of friction on iron railways renders the rate of motion when descending an incline frightfully great. We have ourselves descended the Sutton plane on the Manchester railway, followed by above 100 tons of goods, and although not particularly timid, we cannot deny that we felt considerable apprehensions, when on applying the drag to moderate the fury of our speed, it was instantly burned to a cinder. The power of gravity in descending a plane of this kind, which only falls one foot in ninety-six, is perfectly uncontrollable; and if great descents be attempted, we very much fear that the velocities will hardly be consistent with safety.* It must not be forgotten that the more rapid the descent, the less will be the friction, and therefore the greater the velocity due to a given number of perpendicular inches. It would be premature, however, at present to pass judgment on what after all can only be satisfactorily decided by experiment. Meanwhile, we have no hesitation in stating, what every scientific man, after reading what we have above said, will confirm, that there is nothing erroneous in principle, as many have supposed, in the project. On the contrary, whatever be the impelling power, it will be undoubtedly rendered more effective by the undulation of the line; and if steam be the power, it will be rendered doubly effective, by the advantage gained by being enabled to suspend the action of the moving principle from time to time, so as to collect its energies.

We are glad to learn that the patentees have obtained the means of constructing an undulating line of railway of some miles in extent, for the purpose of testing on the large scale what they have already proved on a model.

Their success will mainly depend on the judicious adaptation and selection of the curves into which the line will be divided. It may be worth while to consider, whether the common *cycloid* may not be rendered, by its well known properties, one of the best which could be selected. It will likewise require consideration, what succession of curves will give a *maximum* advantage, when the extremities of the line are at different levels, and to provide not only for the efficient ascent from the lower to the higher level, but likewise for the *safety* of the descent in the contrary direction.

Although upon the whole we have a strong persuasion of the ultimate advantages of this project, yet we can see many practical difficulties which still stand in the way of the patentees, and which will require not only expense, but no little ingenuity to overcome.

* Since the above was set up in type, we learn that a fatal accident has occurred on the spot here alluded to, arising from the engine and train being carried off the rails.

RAILWAYS AND CANALS.

From the Monthly Magazine.

[We have already presented (see page 56, No. 1,) some extracts from the pamphlet which forms the subject of the following article. The two pieces when compared, may enable the reader to decide more correctly on the respective and opposite advantages and disadvantages of railways and canals. The alleged unfitness of the English railways (which are formed of stone and iron) for the rapid movement of steam carriages, does not apply to those of America, where the more elastic and yielding material, wood, is substituted for stone. This important advantage was not anticipated; and when added to the greater cheapness of wooden rails, will more than compensate for their want of durability.]—*Ed. Farm. Reg.*

Although the splendid advantages of the railway system have become already apparent in the mining and manufacturing districts of England, we regret, that more than ordinary opposition has been arrayed against its progress. In the vast and immensely varied and complicated commercial interests of this great nation, it is certain that no improvement can ever arise without producing a partial loss to the few whose capital is invested in works which the improvement supersedes; and in proportion to the extent of the change, is the corresponding disadvantage to former speculators. Thus, the rising powers of the railway system, are bringing on the entire annihilation of many millions of property invested in canals, the alarmed proprietors of which are struggling by parliamentary opposition, and by distorted and unfounded statements and calculations, through the medium of the press, to stay the progress of these splendid undertakings. Among other publications on this subject, we have been particularly interested by two pamphlet letters upon the comparative merits and advantages of railways and canals, by Mr. Thomas Grahame, a gentleman connected with the Ardrossan, or Paisley canal; and containing a description of certain experiments and observations made at Glasgow in 1832. This writer details the particulars of a novel discovery in the practice of canal navigation, from which it appears that, contrary to all former calculation, the facility of draught is immeasurably increased by the adoption of a rapid pace upon canals; for, in the words of Mr. Graham, "two horses on the Paisley canal, draw with ease a passage boat with its complement of seventy-five or ninety passengers, at the rate of ten miles an hour, whilst it would kill even double that number of horses to draw the same load along the canal at the rate of six miles an hour; and it would be decidedly easier to draw the load at the velocity of fifteen miles an hour than at the rate of six miles. The ordinary speed for the conveyance of passengers along the Ardrossan canal has, for two years, been from nine to ten miles an hour; and although there are fourteen journeys along the canal per diem, at this rapid speed, the banks of the canal have yet sustained no injury." This important change in the practice of inland water-carriage, is made the foundation by Mr. Grahame, of certain calculations tending to demonstrate the greater cheapness of transit by canals than on rail-roads; and before proceeding to expose the delusive nature of his statements, we acknow-

ledge with great pleasure, that the pamphlets of Mr. Grahame are only too late to effect any material service to the nation, and would have formed an invaluable communication about twenty or five-and-twenty years ago.

Let us examine a few of Mr. Grahame's other statements:—"the canal conveyance to London," says he," is already far cheaper than that on railways; and the Liverpool and Manchester railway company, in their competition with the water carriage, have obtained but a very trifling proportion of the traffic from the canals. The expenses of conveying even this fraction of the trade, have been so enormous, as to make it doubtful whether the railway company do not suffer a regular loss upon their carrying trade, which is defrayed from their profits as coachmasters." Now, this is all undoubtedly very true respecting the one particular railway from Liverpool to Manchester—the worst and most extravagantly planned, built, and managed in all the British dominions; but is by no means true of many other railways, such as that from Stockton to Darlington, where the rate of conveyance does not exceed one halfpenny per ton per mile, whilst the rate on the Manchester road is precisely *nine times* that sum, being twelve shillings per ton for the whole distance, which is thirty miles. The cause of this enormous rate of carriage upon the Liverpool railway, is the great and entirely needless cost of steam power, in the use of which the directors persevere, at a loss to the public of some hundreds of thousands per annum.

Let us suppose that the use of these steam engines were discontinued, and the entire carrying trade of the railway were performed by horses. First, it is necessary to remark, that a decrease of speed would be altogether immaterial in the conveyance of goods, for the short distance between Liverpool and Manchester, since the wagons might travel in the night; or, starting at three in the morning might arrive in six hours, drawn by horses, as effectual in time for business as though conveyed as at present in two hours by unnecessary steam. By the substitution of horses, in the place of steam engines, the rate of carriage might be at once reduced from twelve shillings to one shilling per ton!—a change which would effectually shut up the canal—increase the dividend upon the stock of the railway—save almost a million per annum to the merchants of Manchester and Liverpool, and through them to the mass of the people, who consume the commodities carried upon the railway.

We prove this assertion by the following calculations. The weight of goods now annually passing between Liverpool and Manchester, amounts to about fourteen hundred thousand tons; and as no canal could compete with a railway at the rate of one shilling per ton, which involves the loss of eleven-twelfths of its present revenue, it is certain, that the whole fourteen hundred thousand tons would thenceforth be carried upon the railway. Now, fourteen hundred thousand shillings at the rate of one shilling per ton, amounts to the annual sum of £70,000, whilst the expense of conveying these fourteen hundred thousand tons will be shown to amount to no more than the sum of £23,040, leaving a profit of $46,960. The average amount of tonnage will be about four thousand tons per diem; and one horse upon a railway can draw twenty-five tons a distance of ten miles, at a pace of five miles an hour, and return with another load of twenty-five tons; thus performing two stages, or twenty miles, and conveying a load of fifty tons per diem. One hundred and sixty horses will, therefore, be required for the conveyance of four thousand tons; and as there will be three stages in a distance of thirty miles, the entire number of horses between Liverpool and Manchester will amount to four hundred and eighty. The weekly cost of maintaining four hundred and eighty horses, we will estimate at the abundant rate of twenty shillings per horse, intending that sum amongst so large a number to cover the expense of feeding, stabling, attendance, and other incidental charges. This amounts to the sum of £480 per week; and the annual charge for an establishment of four hundred and eighty horses is, therefore, £23,040, which sum deducted from £70,000, leaves a balance of £46,960 for paying the interest upon the stock, the expense of management—the purchase and repair of wagons, and all the general expenses of the railway. The stock upon which interest is paid, amounts to about the sum of £800,000, the annual interests of which is £40,000 at the rate of five per cent., which must be allowed to be a good return from a concern, more substantial, certain, and unfailing, than any real property whatever. Thus, after paying a dividend of five per cent., we have a clear sum of £6,960 remaining for other expenses, from the carriage of goods alone from Liverpool to Manchester. To this sum of £6,960, is to be added the entire revenue derived from passengers, which Mr. Grahame asserts now pays the entire expenses of the railway, covering also a loss upon the conveyance of goods, and yet affording the shareholders a dividend of seven and ten per cent. The entire receipts from passengers we find accordingly to exceed the sum of £200,000 per annum; but as we have already, by the substitution of horses for the conveyance of goods, converted the present loss into a dividend of five per cent., with a balance of £6,960 remaining for the general expenses of the railway, it follows, that less money will now be required to be made by the conveyance of passengers, and therefore, a corresponding reduction may be made in the rate of passage. We propose, then, to convey the carriages by horses, at the rate of twelve miles an hour, whereby the diminution of the cost by the disuse of steam, added to the vast increase of passengers by the shutting up of the canal, will allow the rate of passage to be lowered from seven shillings, and three shillings and sixpence, to two shillings and one shilling, for each individual; one or two steam carriages being still maintained for the conveyances of the mails and passengers at a superior fare. Thus at this low rate of passage we may reckon upon the receipt of an additional £70,000 per annum, which will give the sum of £40,000 for an additional dividend of five per cent.; (the stock of this railway having risen about one hundred per cent. above par, ten per cent. is required in justice to the recent purchasers,) with a balance of £30.000 remaining to be added to the sum of £6,960 cleared by the carriage of goods. Thus, after paying the shareholders a dividend of full ten per cent., we have the sum of 36,960, finally remaining for upholding the railway, being upwards of £1,000 per mile, for a distance of

thirty miles. When, therefore, we see that the affairs of the company will be improved by this change of system, and that a million per annum will be saved to the public now paid to the steam engine builders and to the Marquis of Stafford, for carrying fourteen hundred thousand tons upon the canal, at the rate of twelve shillings per ton; and when it is remembered, that not the directors and the shareholders only, but the public generally, are interested in the most economical management of railways, and the consequent reduction of the rate of carriage, and thence, of the necessaries of life,—acts of parliament, which cause the violation of the property of unwilling individuals not being passed for the sole benefit of the directors and stockholders, but for the general welfare,—it is time that a different course of management should be required to be adopted by the directors of the Liverpool and Manchester railway.

It will undoubtedly be answered, that twenty-five tons, conveyed ten miles in two hours, is an exaggerated estimate of the powers of a horse upon railways. Indeed, in the lectures of Dr. Lardner, upon the steam engine, that learned person is made to estimate the daily performances of a horse at twelve tons conveyed a distance of twenty miles at the rate of two miles an hour. But upon the supposition and calculations of Doctor Lardner, this is very far from being equal to the conveyance of a load of twenty-five tons, even for a distance of ten miles at the rate of four miles an hour—the rate of draught being represented as decreasing in a very rapid proportion, by an increase of speed, even in the proportion of one hundred and fourteen to fifty-three, from four to seven miles an hour. But with every posible respect for the authority of Dr. Lardner, we beg to suggest, that this is an unfounded and insufficiently considered calculation; for the principle operates in a manner *the very reverse* of this supposition, owing to the increasing *impetus* upon an increased speed, for which Dr. Lardner has made no allowance whatever. This, upon a railway, where the resistance is slight, and the weight conveyed so heavy, is an immense consideration; and if the force of traction be twelve times greater upon a turnpike road than upon a level railway, so the impetus will be twelve times greater upon a railway than upon a turnpike road. It is the increase of impetus which facilitates the draught of the boats upon the Ardrossan canal, when drawn at the rate of twelve miles an hour, as described by Mr. Graham; for if the towing rope were suddenly to be severed, the boat, without any other propelling power than its own headway, would, probably, proceed for a distance of a quarter of a mile: but if the rope attached to a barge of similar weight, and travelling at the rate of only two miles an hour, were similarly served, the barge would, probably, proceed but a very few yards.

The practice of the directors of the Ardrossan canal ought undoubtedly to be introduced upon all railways, for similar advantages are produced by an increase of speed in land carriage; and this indeed may be illustrated by the instance of the Birmingham mail, as described by Dr. Lardner. He says, that "the mail weighs two tons, and is conveyed at the rate of ten miles an hour." Therefore, at the rate of one hundred and fourteen, at four miles an hour, to thirty-two at ten miles an hour, the same four horses would draw the Birmingham mail, though it weighed more than seven tons and a half, which is known to be double the load of the four-horse wagons of the London coal merchants, though not travelling at a rate exceeding two miles an hour. But if the Birmingham mail weigh two tons, many of the stage-coaches are heavier built, and carrying sixteen passengers, with a due proportion of goods, will weigh more than four tons, and yet travel at the rate of ten miles an hour; to correspond to which, the weight to be drawn at the rate of four miles an hour would amount to more than fifteen tons, which of course could not be moved by any four horses in the world. Therefore, we entertain no doubt whatever that a rapid rate of conveyance, with short stages, and rest and refreshment intervening, is the most economical expenditure of the powers of the horse, and contrary to the doctrine of Dr. Lardner, that twenty-four tons may thus be conveyed with incomparably more facility at the rate of five miles an hour, the proper pace for an English cart-horse, than twelve tons at the rate of two miles an hour. The experience of Mr. Grahame, "that it is much easier to draw a boat along a canal at the rate of fifteen miles an hour, than at the lower velocity of six miles," is equally true with reference to rail-ways; but though twelve tons, according to the estimate of Doctor Lardner, were the utmost daily performance of a horse, conveying that load for a distance of twenty miles, still the number between Manchester and Liverpool would only be required to be doubled, at an increase of the expense of £23,040 per annum, which sum would amount to an additional charge of four pence per ton upon the conveyance of goods; and even at the extreme charge of one shilling and four pence per ton, it cannot be contended that the rail-way would continue to be opposed by the tedious canal.

I do not assert that horse power is in reality cheaper than the steam engine, upon a properly constructed rail-way; but the Liverpool and Manchester, and all other yet existing rail-ways, are inapplicable altogether to the economical use of steam locomotive power, and were probably not projected for the use of any other than horses in the conveyance of goods.

Enough has already been said, however, to prove that no comparison whatever exists in the cost of conveyance by rail-ways and canals, for we have seen that upon the Manchester and Liverpool rail-way, a charge of one shilling per ton produces a splendid dividend of ten per cent., by the employment of horses alone; from which it follows that for a distance of one hundred and twelve miles, the estimated length of the London and Birmingham rail-way, the charge will not exceed three shillings and sixpence per ton; whereas the present cost of conveyance by the canal, from Birmingham to London, is *three pounds per ton*—almost twenty times the rate upon a well managed rail-road. And as a rail-way is thus a more substantial, cheap, and durable conveyance, never obstructed in the winter, and requiring none of the immense expenditure for cleaning out, and attendance and repair of locks, banks, and walks, it is certain that the canal will be no longer able to compete with the rail-way. With regard to the wide difference in the cost of steam locomotive engines as compared to the labor of horses upon rail-

roads, we believe the true cause to be in the entire inapplicability of the steam-engine, in its yet cumbrous construction, to the purposes of motion. The friction and enormous weight of so monstrous a mass of iron, coal, and water, added to the load of the usual train of wagons, is calculated to defeat even the stupendous powers of the steam engine. A locomotive engine may be justly compared to a moving animal, the load of fuel and of water corresponding to the provender and water of the horse; and a steam coach or a locomotive engine on a rail-way, moves under the disadvantage of a horse burthened, in addition to a load, with his own supplies of water, provender, and corn. The wear of locomotive engines upon the Manchester and Liverpool rail-way, has, from this cause, proved so expensive, as materially to defeat the advantages of this great work, for an engine of the value of one thousand pounds does not endure for a period of three months, and thirty-six locomotives are required to be maintained, to supply the daily complement of six. Previously to the opening of the Manchester rail-way no just experiment had indeed been made of the cost of locomotive steam power, and until the steam engine shall be yet vastly simplified in its construction we hold that its cost may be fatal to its use, and that the interests of the shareholder and the public require that for the present it should be abandoned.

When reduced to their lowest practicable cost for conveyance, boundless indeed will be the results of the rail-ways, which, at an early day, will throw their giant arms across the commercial divisions of this great empire. Cities now covering a circumference of miles will die away—dispossessed of their peculiar advantages, from the vicinity of harbors, rivers, coal, and the useful metals; the most inland districts will enjoy the advantages of sea-port towns; and property will become equalized in value to the most distant portions of the kingdom. The rail-road projected from London to Dover will alone overturn the grandeur, and even the very foundations of the modern Babylon—for it will assign to Dover the entire shipping business of London, and finally close the Thames. The expensive and circuitous navigation of the Downs and the river will be avoided—millions per annum, now paid for pilotage, dock dues, and the innumerable charges of the Thames, will be saved to the commerce of the kingdom—the sea-faring population will be drawn off from the pestilential haunts of the port of London—and the plough will soon pass over the ancient and filthy towns upon the Thames; the banks of which will exhibit a beautiful, still, and natural scene—a most desirable view, although anticipated by Volney with great regret. For London is one immense monopoly—engrossing through the court, the East Indian Company, the Bank of England, and the various departments of the government, the expenditure of almost all the revenue of the country; draining and weakening the provinces. The distribution, and not the accumulation of wealth, should be the true object of all commercial legislation—and the rail-road projected from Dover to Birmingham should receive the most zealous support of the government, if only to scatter the stagnant treasures of London through the impoverished and distant inland districts of the kingdom.

It is, indeed, to be most deeply regretted, that the opposition experienced in the upper house of Parliament should cast so disheartening a prospect upon these splendid undertakings. Upon the Birmingham and London rail-road alone, the parliamentary expenses have already amounted to the vast sum of £40,000, and it is not reduced to a certainty, that the expenditure of double that sum will ensure the passing of the bill. This forms so great a proportion of the expense to be incurred for the entire undertaking, that we would suggest to the directors of that and similar works, that measures may be taken to obviate the necessity of applications to parliament at all. The immense sums thus expended, would abundantly suffice for carrying a railway, by a private company, though by a more circuitous course, and through the lands of consenting proprietors. When it is remembered that the splendid canal undertakings of the late Duke of Bridgewater were executed by one private fortune, and without any parliamentary advantages whatever, we cannot doubt that, amongst the wealthy speculators in this great nation, there are abundant resources for the intersection of the kingdom with railways, carried on from town to town by private individuals, or small companies alone. It is indeed devoutly to be wished, that in the present stagnant condition of our commerce, these works may be seen to proceed with rapidity, and that the renovated spirit of our reformed institutions may influence the progress of a system, the results of which will be boundless to the future welfare of mankind.

ANCIENT GREEK LEASE.

From the Foreign Quarterly Review.

The attention of the learned world has recently been called to some inscriptions of unquestionable authenticity, brought from Greece many years since, and now in the University of Leyden, which had hitherto been most strangely overlooked, that contain not merely an allusion to the practice of letting land in Attica, but leases actually entered into. One of these inscriptions was found near Mount Hymettus, and is dated in the fourth year of the 108th Olympiad, or 345 years before the Christian era. It is a lease by the Aexonians, the town's people, or demos of Aexone, of a piece of land called the Philais, near Mount Hymettus, to a father and his son, for forty years, for 152 drachms a year. But as the inscription is exceedingly curious and instructive, we take the liberty to subjoin the following translation of it, which we believe will be found to be sufficiently exact:—"The demos of Aexone let on lease the Philais, to Autocles, the son of Auteas, and to Auteas, the son of Autocles, for forty years, for 152 drachms a year; the said land to be farmed by them, or planted with trees, as they please; the rent to be paid in the month of Aecatombæon. If they do not pay it, they forfeit their security, and as much of the produce as they stand in arrear. The Aexonians, not to sell nor to let the land to any one else, until the forty years have elapsed. In case of a loss on the part of the tenants by hostile invasion, no rent to be paid, but the produce of the farm to be divided between the Aexonians and the tenants. The tenants are to deliver up half the land fallow, and all the trees upon the land; for the last five years, the Aexonians may appoint a vine dresser. The lease to begin with respect to the

corn land with Eubulus the Archon entering into office: but with respect to the wood, not before Eubulus goes out of office. The lease to be cut upon stone, to be set up by the magistrates, one copy in the temple of Hebe, the other in the Lesche, and boundary stone (oroi) to be set upon the land, not less than two tripods on each side.—And if a tax should be paid for the land to government, the said tax to be paid by the Aexonians, or if paid by the tenants, to be deducted from the rent. No soil to be carried away by digging of the ground, except from one part of the land to another. If any person makes a motion in contravention of the contract, or puts it to the vote, he shall be answerable to the tenants for the damage." And there are some further stipulations with respect to the "cutting of the olive trees, and the division of the price obtained for them between the Aexonians and the tenants." Now it appears clearly from this inscription or lease, that the mode of letting land for a money rent, for a considerable number of years, and under conditions with respect to management, must have been well understood in Attica. The terms of the lease are such as indicate a very high state of civilization, and a very considerable knowledge of agriculture. In proof of this, it is only necessary to advert to the clause binding the tenants to have half the land in fallow, at the termination of the lease, and to that which authorises the Aexonians, or lessors, to appoint a vine-dresser for five years previous to the expiration: the making different entries to the corn and vine land, the provisions with respect to the damage that might arise from the hostile invasions, and the interdiction of carrying away any portion of the soil to another, farm, all discover a disposition to protect as far as possible the just rights and interests of both parties, and to advance the progress of agriculture. The lease cannot be objected to on account of its being for too short a term; in this country it might be thought too long.

[We are pleased to learn from the following article that the farmers of one of the most fertile and beautiful portions of Virginia are in concert and in motion, to improve the wide field and bountiful resources for improvement, which nature has placed before them. There will be difference in opinion as to the best manner of action for agricultural societies to promote their objects: but let them act in almost any way, and they can scarcely fail to do much good.

If we were not restrained by the consideration of being personally interested in the result, we should express more at length our approbation of the novel plan adopted by the Rockbridge Agricultural Society in offering Agricultural Journals as premiums. To make the reward more appropriate and perhaps more valuable, volumes of the Farmers' Register that may be required for this purpose, shall be delivered well bound, and lettered suitably to their destination.]—*Ed. Far. Reg.*

ROCKBRIDGE AGRICULTURAL SOCIETY.

From the Lexington Union.

At a meeting of the board of directors of the Rockbridge Agricultural Society on Saturday 22d June, it was ordered—that the following premiums be awarded at the annual meeting in October next:

1. For the best bull, not less than three nor more than four year's old—one year's subscription to the Farmers' Register.

2. The best heifer, not less than two years old—one year's subscription to the American Farmer.

3. The best milch cow—one year's subscription to Farmers' Register.

4. The best fat ox—one year's subscription to New York Farmer.

5. The best brood mare—one year's subscription to the Turf Register.

6. The best colt, not more than one year old—a handsome pair of stirrup irons.

7. The best ram, not more than four nor less than one year old—one year's subscription to the Virginia Farmer.

8. The best ewe, not more than four nor less than one year old—same premium.

9. The best boar, not more than four nor less than one year old—one year's subscription to the New York Farmer.

10. The best sow not more than four nor less than one year old—a pair of fine ivory handled carvers.

11. The best stallion, not less than four years old--a silver cup, with a suitable inscription or device.

12. The best stallion not less than two nor more than four years old—one year's subscription to the Farmers' Register.

13. The best filly, not less than two nor more than four years old—a pair of silver spurs.

14. For the greatest quantity of Indian corn produced on any contiguous five acres of low ground or bottom land, not less than fifty bushels to the acre—a silver cup with a suitable inscription or device.

15. For the greatest quantity of Indian corn produced on any contiguous five acres of upland, not less than forty bushels per acre—a silver cup with a suitable inscription or device.

16. For the best piece of linen cloth for shirting or sheeting, one yard wide, not less than fifteen yards—a pair of silver sugar tongs with a suitable inscription or device.

17. For the best piece of figured table linen, one yard or more wide, not less than nine yards--a handsome cut glass bowl.

18. For the best piece of flannel, all wool, not less than 3-4ths wide, nor less than fifteen yards—a handsome pair of cut glass pitchers.

19. For the best piece of flannel of wool and any other material, the chain of which may be purchased—a pair of handsome sugar tongs.

20. For the best piece of cassinet or woollen jeans, ten yards, chain may be purchased—a handsome pair of china pitchers.

21. For the best pair of blankets, two yards wide and two and a half yards long, with or without a seam—a handsome Britannia coffee pot.

22. For the best piece of carpeting, one yard wide and not less than twenty yards long, all wool—a handsome parlor mirror.

23. For the best piece of carpeting, one yard wide and not less than twenty yards, made of wool and any other material—a handsome cut glass bowl.

24. For the best cheese, not less than fifteen pounds—a handsome cut glass pitcher.

25. For the best dozen skeins of sewing silk manufactured within the county--a silver thimble with a suitable inscription or device.

26. For the best specimen of soap manufactured in the county--same premium.

Resolved, That each person to whom a premium may be awarded, shall furnish the president (if required) a written statement detailing the particular mode adopted in the culture, rearing, manufacturing, (or otherwise as the case may be,) of the subject to which a premium has been awarded.

Resolved, That the president solicit Dr. Joseph W. Farnum, Professor of chemistry in Washington college, to deliver to the quarterly meeting of this board a lecture on chemistry as connected with agriculture.

Resolved, That this board adjourn to the third Wednesday in September next.

ROBT. R. BARTON, *President.*
JOHN P. CARUTHERS, *Rec. Sec'ry.*

OBSERVATION ON THE PROFIT ATTENDING THE CULTURE OF THE GRAPE.

From the Southern Agriculturist.

Columbia, November 3, 1832.

DEAR SIR,—I have been a much longer time than I thought possible, without either writing to you personally, or communicating to you any thing for the *Southern Agriculturist*. I am not, however, without some excuse for this apparent neglect, and among them, this, that I cannot find any subject to write upon that is likely to be interesting to your readers, and that I cannot write unless the "spirit moves me."

As to the culture of the vine and the making of wine, these subjects have been amply discussed in the former numbers of your most useful periodical. It does not appear to be a subject in which many in this state seem to take an interest, and *I have so long been preaching to an indifferent congregation*, that I fear doing more harm than good to the good cause by saying any more about it, yet some of my predictions on this subject are beginning to be realized; for a gentleman about sixteen miles from this, (Mr. Abraham Geiger) has made this year about six thousand five hundred gallons of wine. My vineyard not being any thing as extensive as his, I made only nine hundred gallons. This, however, is very well from our sand hills, which only produce, *in good years*, and with careful culture, about five bushels of corn per acre.—The capability of this kind of land to produce good wine, and that in abundance, is proved beyond the reach of cavil, and, in spite of the sneers of such persons as can find nothing good that does not come from a great distance, and does not cost a great deal of money. Let the prices of our wines, however, be reduced to ever so low a rate, even that of vinegar, yet the culture and the production of it in lands that cost from twelve and a half cents to one dollar per acre, and may produce, and does sometimes produce, as much as one thousand gallons per acre, must be an object of importance to this state, whose population is fast leaving it, and has not many other means of inducing it to remain. Our policy, it seems to me, most certainly is, not merely to do our utmost endeavors to retain our thin population within our limits; but also to encourage the settling of foreigners among us. What will become of us at last is more than I can or am willing to predict, if we continue to disregard our natural advantages, when the policy of our neighbors, and the politics of too many amongst ourselves, have a direct tendency to reduce, and does reduce us every day lower and lower. You will, probably, sir, blame me for being thus querulous. I admit that I am rather so; but you must also admit, as I do, that I am an old man. I wonder if Cassandra would not have become somewhat querulous had she grown to be an old woman?

We have, however, five or six vineyards in a good state of progressiveness in this vicinity, some of them pretty extensive for beginnings, and I hope their future success and example will be of due avail to the patriotic cultivators of them and to the country; for it is never too late to do good, at least I hope so.

I am, very respectfully, dear sir, your obedient servant,

N. HERBEMONT.

SHEEP.

From the Lancaster Examiner.

Of all domestic animals, the rearing of sheep is to the husbandman the source of most pleasure and profit. Their management then, and a means of protection for them, will deserve from us a passing notice.

It may be said that of all kinds of stock sheep require the least attention and expenses from the farmer. The sheep is the only animal subjected to the control of man, which will voluntarily endure abstinence from water, requiring it only in the event of being housed. Sheep, when confined in an enclosure, would require no attention, had the farmers any protection or security for them, against attacks from their dread enemy the dog—in whose presence they uniformly discover an instinctive though justly excited panic.

Permit us to inquire into the advantages of sheep and stock, before we indulge in remarks on their management. A principle in farming which should be more generally reduced to practice, is, that previous to laying in stock, the farmer should calculate what species, for a certain amount of money, will realize the largest net profit,—making due allowance for a fluctuating market. Suppose a farmer has sixty dollars to invest in stock, which in the month of July or August, will buy him forty good ewes. If they be managed according to our adjoined directions, and kept one year, we think the annexed statement, if not exactly, will be very nearly answered.

40 good sheep will have 150 lbs. wool at 40 cents, - - - -	$60 00
40 lambs fat in August, worth $2, -	80 00
40 ewes, when fat, will advance in price 50 cents, - - - -	20 00
Clear gain, - - -	$160 00

A careful and judicious experiment will prove the above statement to be perfectly practicable.—We have known the amount of wool from the same number exceeded both in price and in quantity.—We have known the number of lambs increased fifty per cent. Some may ask the question, how realize even the statement, save the increase? Before the reader has marvelled at our statement, we submit the management and means. 1st. By extreme caution in the selection and purchase; choosing such only as have a good vigorous coat of wool; avoiding age, which should not exceed four years—the mouth being the best index to the age. 2d. By paying attention that the male be admitted and kept with them, from the middle of November, and a due regard to the maxim, "*A sheep fat never will fatten again.*" 3d. By attend-

ing them in winter and in yeaning time, with scrupulous care.

Although sheep feed sparingly, yet it is important that they have plenty of the best clover hay during winter; and in the yeaning season, (ewes go five months with young,) they should be provided with a hovel, to protect the yeanings from all wet and excessive cold weather. At this season the feed for the ewes should consist of bran, chopped oats and corn mixed in equal quantities—allowing each one pint per day, and giving them one half in the morning and the other in the evening. This feed is admirably calculated to increase their milk—the grand mystery in raising lambs. Whole grain must be avoided. It invariably disposes the fleece to waste and drop off more or less before shearing time. When the pasture is insufficient alone to support them in winter, they should be kept in a yard or ploughed field, for such is their inclination for green food, that while they can get a mere taste of it, they will suffer on hay. If the ewes are of good size, the majority will produce two lambs. It is necessary to see to the lambs for several days after they are yeaned, and ascertain whether they are acknowledged by the ewes, or suck. If so, there is no danger; they do well, provided they have shelter, and the ewes are regularly fed; in which case it will be nothing extraordinary to raise all. It may not be irrelevant to state, that lambs must be kept where old breeding sows cannot come in contact with them—a voracious enemy, which will soon swallow them alive; none can be trusted. Lastly, by turning all upon good pasture about the last of May, and giving bran with salt regularly, they fatten very readily, and at that season are always in demand. The lambs will command as much as the ewes when fat. While unacquainted with the raising of sheep, we could not have subscribed to the statement above submitted; but with these directions as a guide there will be little danger. Verily then, fellow farmers, the subject must be worth your attention! Feeding cattle, or wethers, will not compare in point of profit with rearing sheep and fattening on pasture.

It may be added, that ewes can be procured for considerable less money than wethers. If the sheep hovel be well supplied with litter, the amount of manure will also exceed that of any other stock, in which the same amount of money has been invested. Sheep manure, for fertilizing properties, ranks next to that of pigs.

REMARKS ON THE FIRST NUMBER OF THE "FARMERS' REGISTER."

From the Albany Argus.

☞ *Ruffin's "Farmers' Register."*—A valued friend, who unites the science with the practice of agriculture in a degree not less advantageous to the public than agreeably to himself, writes as follows in relation to this new publication. We give it a ready insertion, as a deserved notice, from a source that adds weight to the commendation, of a periodical that promises to be a valuable auxiliary in the efforts to improve and elevate agriculture as a pursuit, and to extend a knowledge of it.—[*Ed. Alb. Argus.*

Mr. Editor,—I am indebted to the kindness of a friend for the early perusal of the first number of "The Farmers' Register, a monthly publication, devoted to the improvement of the practice, and support of the interests of agriculture," edited by Edmund Ruffin, esq. and printed in Richmond, Virginia. As the columns of the Argus have been occasionally opened to communications on the subject of agriculture, I trust the few observations I intend to make on the appearance and character of the publication alluded to, will not be denied that privilege. I am the more anxious to avail myself of it in the present instance, not only because the merits of this new periodical deserve the notice, but a new era is certainly opening upon us, when, from the Old Dominion, where they have so long complained of their poverty stricken soil, her sons boldly step forward and take the only proper method to resuscitate her agriculture, and thus to enrich her citizens.

The Farmers' Register opens well. It begins with a description of Virginia, which is sufficiently particular for the information of the reader, and whilst it is full of instruction to a non-resident, to a resident it is invaluable, for it throws open the whole field of the intended operation of the publication before him.—The face of the country, its civil divisions, its internal improvements, its agriculture, manufactures and climate, are all briefly examined—he sees, in a word, what nature made it and what man has done; and to cheer him onward, that if more is to be effected by his industry and his enterprise, the reward will be a full equivalent for the labor. To take up the several articles in detail, when each is sufficiently interesting and instructive, can hardly be required, as they are all, whether original or selected, written with an ability and clearness which is sure to arrest the attention of the reader, and he cannot rise from the perusal of them without having his mind improved and his ideas of the importance of good farming made more deep and abiding. There is a richness, a raciness, and a sufficient variety in them to form an agricultural repast for the learned and the unlearned, the scientific and the practical farmer. If the Register does not hereafter "break its word of promise to our hope," it will have an effect upon the interests of the state of its birth signally beneficial and enduring. When we urge to the improvement of agriculture, we strike upon a mine of wealth which in this country is just opened, and although we are beginning to feel its beneficial influence by the diffusion of its many comforts, its extent and its richness are yet far hid and will not be attained but by a perseverance worthy of our industry and intelligence. It is fortunate for the cause that such men as Mr. Ruffin engage in it, for we require no farther proof of his competency, than the collection of articles he has now given to the public. Neither ought the patronage of the Register to be confined to the Southern states: To inculcate correct principles of farming is useful every where, and we find upon examining the book before us, that the safe system for the successful cultivation of our great staples, wheat and corn, is not changed by the difference of latitude. It represents the agriculture of Virginia as in a low state, and that the owners of many estates deem themselves fortunate if at the end of the year the simple cultivation of their farms has not run them in debt. To correct this evil for the future, let them turn to the well conducted farm of Fielding Lewis, Esq. of Wyanoke, and learn by what a simple process a barren sand has

been converted into a rich and valuable soil. The farming of this gentleman is worthy of all imitation, and if his example is not followed, now that the description of it is given, his fellow citizens do not deserve success, for his system is upon the best English and Flemish models.

Passing over many excellent articles, we now come to the chapter on slavery and emancipation. This is very properly introduced into the publication, as their slaves perform all their agricultural labor, and it is a subject of thrilling interest to all the states south of the Potamoc. Each side of the question is alternately taken; for slavery and against it, for emancipation and against it; and it is discussed for good and evil with a liberality and frankness, a force and clearness, an evident desire to arrive at the naked truth, that during the entire reading of the article the interest excited is truly painful: And the inquiry, what are the circumstances under which slavery exists in these states—what its consequences, in a civil and moral aspect—what the remedy, and what the most attainable means of applying it? is pursued with equal candor and patriotism.—There is no concealment of the effects of slavery; the combatants are above it; and when the public will listen to the argument, as it is here conducted by men of strong intellect, who understand their subject and are not afraid to grapple with it, a judgment will be pronounced according both to the law and the testimony. It is another proof that "error of opinion may be tolerated where reason is left free to combat it," and that upon this subject our southern friends are seeking information, and need no intermeddling in the decision of what so nearly concerns them. But this is not all, the free discussion of this question is all important to Virginia. She has long complained that the embarrassment of her citizens has been increased by the disquietude of her blacks. The first step to cure an evil, is to ascertain its cause. The ability and earnestness with which she has commenced the investigation, is a sure precursor to success; and if there has been an improper interference by little and malicious spirits to produce this disquietude, their efforts hereafter will be unheeded, for in the collision of great minds, the ravings of weak and wicked ones are neither felt nor regarded.

A FRIEND TO AGRICULTURE.

The reputation of the Farmers' Register belongs to its contributors, and they have a right to know how their work stands in the opinions of impartial and intelligent agriculturists abroad. Of the intelligence of the writer of the foregoing remarks, his own language is sufficient testimony—and his impartiality is equally certain, as we know not who is the writer, and have not the good fortune to have either personal acquaintance or correspondence with a single agriculturist, (and indeed with scarcely a single inhabitant) of the great state of New York.—[*Ed. Farm. Reg.*

WATER OBTAINED BY BORING, IN THE CITY OF NEW YORK.

New York, July 8.

We are happy to learn that the persevering endeavors of Mr. Holt to obtain water by boring have at length been crowned with success. About the middle of last week, the person engaged in boring was delighted to find that he had struck a stratum of limestone, from which he predicted that he should find water in three or four days. On Friday afternoon, the drill, which had been sinking with increased rapidity since it entered the limestone, suddenly dropped about two feet at a single blow, and then struck upon a very hard rock below. Immediately a strong current of water arose, and there is reason to hope it may prove to be of the desired quality. It is supposed to be so copious that it will afford a constant supply of as much as can pass through the pipe, which is about three inches in diameter. On this point, however, it will be impossible to determine with certainty, until the water ceases to be affected by the foreign matter introduced into the passage. The two or three feet through which the drill dropped, is no doubt a brook or fountain; and the fact of a flint rock or something like it, underneath, promises well. The boring will now be discontinued. We understand that no vein of water of any magnitude had been struck since entering the rock about 130 feet below the surface. Some water, we believe, was obtained before entering the rock, but it was of an inferior quality. The cost of the undertaking cannot be less than $2,000 or $3,000. It has been in progress nearly two years.

[The drill had, within the last six months, penetrated 650 feet in depth, of which 510 feet are of solid rock. So much for *perseverance.*]

EXTRACTS FROM PRIVATE CORRESPONDENCE.

Amelia, June 19th, 1833.

I congratulate you and the agricultural public, on the appearance of the first number of the Farmers' Register—the more, as the style and execution of the work so far surpasses what we had a right to expect in a first effort. It is perfectly obvious that unless aided by liberal contributions (on the part of farmers,) of the results of their labors and observations, a work so large cannot long be sustained by the efforts of any single individual; and, as I believe the existence of it is almost essential to any great improvement in our agriculture, I shall feel impelled by duty to contribute my poor *mite* from time to time to filling its columns, with the belief that nothing in my practice is worthy of imitation—but under the hope that I may effect something by way of example. With this view, I beg leave to suggest to you the making of such direct inquiries of farmers who are distinguished for their success, as may serve to elicit from them a sort of history of their practices.

* * * * * *

Such inquiries, made of R. S—, J. R—, F.L—, T. M—, W. O—, J. W—, R. H—, &c. I am sure would be cheerfully answered, and would go further to spread through the state a knowledge of the best systems applicable to our country, than any other plan I have thought of.

South Quay, Nansemond, June 21.

* * * Will you do me the favor to inform me in what manner the instrument used in boring for marl, should be constructed? I am induced to believe that there is no marl on my land, but being thoroughly convinced of its benefits when properly applied, I am desirous to ascertain beyond doubt whether I have it or not.

As a similar inquiry has been made by another correspondent, we think it may perhaps be useful to others also to answer here.

The cheapest and most simple marl-borer is made by welding a stem of five or six feet long, and half an inch square, to any old and useless screw auger, of one and a half or one and three-quarter inches bore. The iron handle, about twenty inches long, should have a square hole through the middle to receive the stem, over which it should slip easily up and down. A screw passing through one side of this handle, and pressing against the stem, fixes the handle at any required height. Small depressions made every twelve inches along one side of the stem, receive the point of the screw, and keep the handle firm.

The auger should not be allowed to bore more than five or six inches before raising it, and clearing the earth away—all of which will be drawn up in the screw, unless the earth is so wet as to be almost fluid. A depth of seven feet or something more, may be very conveniently reached and examined with this instrument—and four or six feet more, by using other pieces with joints to increase the length of the stem, but with much less convenience.

More costly and much more effectual augers for this purpose, have been manufactured at the Penitentiary in Richmond—of which Colonel Morgan, the superintendent, has promised to furnish us with a description.

Elizabeth City, June 22d, 1833.

My attention is now mainly directed to the cultivation of the artificial grasses, and the improvement of our stock of cattle. I have succeeded in the first, and have no doubt of success in the latter: and I think, in a little while, I will be able to convince the most prejudiced, that lower Virginia can produce hay and butter enough for her own consumption, and a little to spare; and thus wipe off the disgrace of purchasing these articles from our less favored but more industrious brethren of the north and east.

June 24th, 1833.

My young friend, the editor of the **** ***** has lent me the Farmers' Register, with which I am much pleased. You will please to send it to me, directed to —— ———. I have long wished to see the commencement of such a work. The experience of thirty-six years has taught me that if the people of Virginia willed the resuscitation of their soil, the work was easily done; and what son of Virginia is so cold, so dead in heart, as not to respond to the calls of his dear, his native land? who so mercenary and degenerate as to abandon a kind mother because she is poor? and poor from his father's neglect? Does not patriotic, does not moral duty require at our hands, that we pour oil and wine into her wounds, heal her broken spirit, and cause her to sing for joy of her faithful sons. In the beginning, God gave the earth to man as his inheritance, and moral propriety requires of him that he hand it down unimpaired; and it is good for morals and humility to keep in mind that we sprang from the "dust of the earth." I pray you not to suspect me of a disposition to preach;—but to go back to first principles, and lay our foundations in a solid manner, is vitally important. Does patriotism, do morals depend upon the abundance of the earth? Who ever saw a roguish horse, cow or hog, that was not made so by want? It is this that, like interest, works day and night, nor does it respect the Sabbath. Craft and fraud and violence, and corruptions of every grade and color, are in the terminations of want and fruitless labor. Permit me to say that the very first thing to be done for the landed interest is to put it under the sacred protection of the law: let every man have and enjoy his own. The concentrated spirits of the lower regions could not have drawn a law more destructive to the interests of agriculture, than that of Virginia, which makes the whole state a *common*, save that which is under a strong close five foot fence. Why not make our garments, or our horses and cows that are not in immediate use also common property?—Land is, and long has been, outlawed in Virginia; and yet it is considered wonderful that her interest should dwindle and waste. * * *

We have long thought with our correspondent that our law respecting enclosures is one of the heaviest and most unreasonable of all the burdens that the farmers of Virginia have fixed upon their own shoulders. The expense of the fencing in lower and middle Virginia which is required (not to confine the farmers' own stock, but) to guard against depredations of the stock of other people, must consume nearly half the average clear profit (or fair rent) of the land. Many are the tracts belonging to widows and orphans, which are left unoccupied and unproductive, because the expense of legal fencing would cost more than the rent the land would afterwards yield.

New York, June 27th, 1833.

I am glad to see old Virginia turning her attention to the improvement of agriculture, the great source of the wealth, power, and virtues of every state, and most especially of yours. The gains of commerce and manufactures may be greater, but they are less secure than those of the cultivator of the land; he is not the slave of foreign or domestic legislation; nor does he depend on an act of congress to decide whether he shall be a beggar or a king. His prosperity depends on himself and his God; and so long as the dews and the rains fall, and the sun shines in the heavens, though the whole foreign world were convulsed, he cannot starve. Like the fabled giant of Grecian story, the Virginian cannot be overthrown; so long as he keeps fast hold of his native soil. You may see the other states riding for awhile on their manufactures and their commerce, passing you in the race of wealth, and outglittering you in baubles and extravagance; but you will, if you are not cajoled or bullied out of your true policy, still adhere to agriculture as the great source of your prosperity. Then you will see the pageants of the paper, the tariff systems, and all the mushroom growth of modern political economists, pass away generation after generation, leaving nothing behind them but the wrecks of their career, while Virginia walks steadily onward, moderately, lastingly, independent and happy.

King George County, July 4th.

* * * You would do good service to many young farmers like myself, by publishing the best treatise with which you are acquainted, upon the cultivation of Indian corn—and by calling upon your correspondents to state the method pursued by the most successful cultivators of this staple.—

I myself feel the want of particular details upon this subject, from the running of the first corn furrow to the housing of the product.

May I also suggest the benefit of a *Price Current?* It is convenient for reference hereafter, if not immediate use.

We had supposed that a *monthly* price current would be of little value to our subscribers, and therefore made no arrangement for the purpose: but if it is desired, there will be no objection on our part.

We recommend to the attention of our readers, the request of our correspondent, to be informed as to the best mode of cultivating corn. So many different and conflicting opinions and practices prevail, that old and experienced, as well as "young farmers," would be benefited by the exhibition of views on this important subject.

July 14, 1833.

CHEAP FARMING.

I have been much gratified by the receipt and perusal of your first No. of the Farmers' Register.

I wish your paper may have the effect of producing some amendment in our farming; and that you may be remunerated for your labor, and good intentions. I am greatly fearful however of your success in both respects.

We Virginia farmers, (I mean such as I am, who are at least four-fifths of the whole,) require to have some plan devised, by which, without *much labor* and with *no expense*, we may improve our lands, and that speedily, or we will remove to the western forests, and encounter all the labor and privations attending a new settlement. We have no notion of submitting to the tardy and laborious systems of your *real farmer*. We go for a kind of *slight of hand* or *no work* plan—or we are off.

Our general course of operations has been, to *cultivate* our lands in corn one year, and *rest them* in wheat the next; and so on, until they are prepared for a good crop of *old field pines*—the best crop by the way, since the introduction of steam boats, of the whole.

A piece of land, thus *highly improved*, I got possession of some years ago; but instead of waiting patiently for the *pine crop*, I determined I would cultivate it every year in corn, until I got it rich; and this too without manure, although I lived near a town where any quantity might have been had; but I scorned all such *foreign aid*.

I prepared the land early, and having procured some buckwheat, I mixed it with oats, and sowed them in March or April. In due time, I planted my corn in drills, say eight feet apart. I ran a single coulter deep on each side: hoed and thinned the corn; and, in due course, turned a slice to it, and gave it another dressing with the hoes. I took no more than was absolutely necessary for the corn, from the oats and buckwheat, until it became proper to break the middlings, and *lay by* the corn. By this time the oats were so matured that the seed would vegetate. I preceded the plough by coultering deep with a single coulter, so as to pulverize the middlings, and then turned them with their coat of oats and buckwheat on the corn, drawing the dirt over the straw with hoes, so as to cover it up pretty well. The corn was a sorry crop, but the ground was well covered with young oats. These I turned in in the fall, and proceeded in like manner, the next year; with this difference, that I had no buckwheat to mix with my oats. This was a bad *look out*: but as it required some little foresight and managemen. to avoid this mishap, it was *beyond me*.

I had heard of the chinch-bug, but had never seen it: and knew not its great fondness for oats. My last ploughing, instead of destroying, saved it even the trouble of travelling to the corn: It had nothing to do but to "*arise, slay*, and *eat*."

Being thus rudely and unexpectedly assailed in my *grand experiment*, I had nothing left but to sow the land down in rye, which I had tried, without success, before I began my experiment. From what cause it proceeded you know better than I do, but so it is, I have rarely seen a heavier crop of rye than I obtained from this sowing.

I sold the land soon after, and so ends *that experiment*.

I have lately purchased another tract, improved to the *pine crop state* also—insomuch, that a crop of rye on part of a field where I purchased, was too mean to be cut, and I ran a harrow over it so as to prostrate it. I observed that even this slight cover produced such a change in the appearance of the ground that I determined last fall to make *another experiment*, if such it may be called.

After taking off a crop of wheat, preceded by one of corn, as usual, and after pasturing the land with stock of every kind, as *imprudently* as any *experimentalist could require*, in testing a plan to counteract bad management; and after all my other crops were sowed, I harrowed half a bushel of rye to the acre, not *in*, but *on* land thus beat hard by the hoof.

It formed no part of *my plan* to have preceded this operation by deep coultering. That would have been too much like your *laborious farming*.

Plaster would cost money as well as time to sow it, and that also was entirely out of *my line*.

In this situation the field was left to shift for itself, except that I kept every thing off it until the rye was ripe. The crop proved better than, under such circumstances, could be expected.

The field was also well covered with white and red clover, and what we call ribwort or narrow plantain, (I don't know its botanical name;) *but if it is good for any thing*, it must be an excellent grass for bad farmers, for it will grow in any place and on any kind of land.

I intended to have prostrated the rye by running a harrow over it, (for I have no roller,) but how can it be expected I would take so much time and trouble? It would have covered the ground much better, it is true, and no doubt would have added greatly to its improvement; but I never have time to do any thing, however proper, that can *possibly be avoided*—and so I have contented myself with turning in my hogs first, and finally my cattle, horses, and every thing, to eat and tread it down, intending this fall and winter to turn in this cover of straw and grass, and plant corn next year.

The adjoining field, now in wheat, I will treat in the same way this fall, and prepare it for corn, to take its course the year after next; and as these fields are better adapted to corn than wheat, I mean to cultivate them afterwards, *alternately*, in corn, harrowing rye in after the corn is cut off, with some clover and timothy seed, (if I can muster energy and cash enough,) so as to have as heavy a cover as possible to tread, pasture down, and

turn in during the fall and winter preceding the corn crop.

If I can discover a place in this, or some such way, to improve our lands, without trouble or expense; indeed one which will *overpay us* at once, for any little trouble or expense we may be at, it may enable *my class of farmers* to remain in the Ancient Dominion, otherwise (unless indeed you can reclaim us and our *lands too,*) we must remove.

But, seriously speaking, my dear sir, could you not cast this matter in your mind, and mature some simple plan of this kind, that might, *as an entering wedge*, do some good, and strike the attention of the great class of farmers, who, from habit, &c. are incapable, at once, of any great and efficient change?

I little expected, when I took up my pen, to trouble you with my *crude* and *unsatisfactory notions*, for they can't be called *experiments*—much less to offer any thing to the public eye. This you will at once see is not my object.

Deciphering such pieces is a price you will have to pay. *We will have our money's worth out of you in some way or other.* I would be ashamed though to expect an answer, other than such hints, if this shall have suggested any, as you may deem it proper to give us in your paper.

By the way, you can also inform us in that way, whether you are acquainted with the ribwort, and what you think of it as an improving grass. It has entirely taken possession of my farm, and I begin to entertain hopes it will prove a valuable grass: if it is not, there is no getting clear of it.

If our correspondent has had "his money's worth out of us," we will take the liberty of getting it back by publishing his letter: his satire will amuse, if it does not indirectly help to benefit, that class of farmers, of which he professes to be an example.

We know of no plan by which improvements may be made and profits gained, without labor and expense—and if we did, its promulgation might reduce Virginia to a still lower state than at present. It is most beneficial for man to be obliged to labor assiduously, or to starve—but in return for his labor, to be sure of obtaining profit and reward. It is precisely in those parts of Virginia where the support (and even many of the luxuries) of life cost scarcely an effort to obtain, and where land is either rich or highly improvable, as well as low priced, that there are more fortunes spending, and fewer accumulating, by the owners of the soil, than in any other part of the commonwealth.

We recommend to the attention of other correspondents, the inquiries respecting ribwort.

———, *South Carolina, July* 8, 1833.

* * * Permit me to add my most ardent wishes for the entire success of your efforts to restore the Old Dominion to her proper scale in agriculture. Her resources, though hitherto much abused and neglected, if brought out, even at this late day, will give her that station among her sister states, which her soil, products, and above all, the character of her people entitle her to hold.—The same causes which have depressed agriculture in Virginia, operate here to an alarming degree. We prefer moving to the virgin soil of the west, to restoring by proper and judicious culture, the land given to us by our ancestors. Political causes also have had a most powerful effect in checking the exertions of the planter in South Carolina. A deep, and I fear, a just belief that the improper legislation of the federal government, has been the cause of our present depressed situation, has become almost universal among our citizens.—There is much truth in all the causes, but no circumstances which have yet existed, can afford any excuse for the want of industry and preseverance on the part of an agriculturist.

Nansemond, July 1st.

———In analyzing marl, do you take a piece of it entirely separated from earth, or just as the marl is found?

To examine and report correctly the strength of any body of marl, a fair sample of the whole body, (one of each kind, if the quality varies at different depths,) should be used. Sometimes the materials vary so much, (as when large and whole shells have their interstices filled with sand,) that no small sample can show the average value. In such case, dig out as much as a gallon, or more, from one place, pound the whole coarsely, so that the shells are broken down to a size not greater than peas—mix the whole together, and again take from it a small quantity as a specimen, which pound finely—and from it, weigh the forty to sixty grains to be analyzed according to either of the two methods described minutely in the *Essay on Calcareous Manures*.

———

From the Farmers' Register.

THE SLAVES OF HUNGER,

Or condition of the laborers in English Factories.

———"In our benevolent zeal for the removal of slavery, we should not forget that there are afflictions, numerous, widespread, and unavoidable in the most refined and advanced state of society, that are even more intolerable than the slave's toil, stimulated by the slave owner's lash. The substance, though not the name of slavery is to be found almost every where in this miserable world—and the few favored spots now free from such causes of human suffering, must in their turn be visited with like inflictions. Except in newly settled countries, or in others having as yet a sparse population and plentiful means of subsistence, and a free government withal, the laboring poor are slaves in fact, either to individuals, to government, or to their own craving and never satisfied necessities. The negro slaves of Virginia present striking examples of the first kind—the people of Egypt, and emancipated Hayti of the second—and the entire laboring population of free and philanthropic England of the third."—*Farmers' Register, p.* 48, *No.* 1.

The people of the United States have been as yet happily exempt from the suffering caused by the extremity of bodily labor and privation; and for that reason, assertions like those in the foregoing passage, will not be readily believed by any who are acquainted only with the different systems of encouraging or of forcing labor in this country. The following proofs and illustrations of the state of misery produced by the slavery to hunger, are more than sufficient to remove those doubts: but they present a state of human suffering, and human degradation, so horrible, that we can scarcely conceive the reality of such things being either exacted or suffered by human beings. Yet no proofs can be more positive. The testimony that will be quoted is extracted by Fraser's Magazine from the *evidence taken by the committee of the house of commons on the factory bill*, and the comments thereon, which follow, are from the speech of Mr. Sadler, the introducer and supporter of that bill, and from Blackwood's Magazine, (the notorious apologist for the abuses of the government, and of the general policy of Great Britain.)

From Fraser's Magazine.

NATIONAL ECONOMY.

We have said, that the manufacturers have entered upon a desperate career of competition—a career which impels them to ever-increasing exertions, without regard to the misery thereby occasioned. Let the following extracts from the *Evidence taken by the Committee of the House of Commons on the Factory-bill*, corroborate and explain this statement:

Benjamin Bradshaw is asked:

"Do you conceive that this labor has been increasing since you were first acquainted with mills and factories?" "Yes, it has increased a good deal these few years past. I can remember when it was considered utterly improper to work them longer than from six to seven; but now it is not so."

Daniel Frasir is asked:

"Is it complained of in those places, as it has been made a matter of complaint in many others, that the labor of the silk-mills has become more fatiguing than it formerly was?" "Yes; and they remark that it is not the same remunerative employment that it used to be; that there is not the same sustenance afforded to the children; in short, that they have to work longer hours and get less meat."—"The question has particular reference to the labor imposed upon the children and young persons; is that more severe than it was—have they more to do—more spindles to mind?" "Yes, and they are urged more to their work than they used to be, which imports that the system has become worse."

William Rastrick is asked:

"Is there a tendency in this system to become rather better, or is the work required more, and the labor altogether severer than it formerly was?" "It is decidedly worse within the last four or five years than it used to be?"—"Is there more work required of the children than there used to be when you first knew the business?" "Yes; on account of the competition which exists between masters; one undersells the other; consequently the master endeavors to get an equal quantity of work done for less money."

John Allett is asked.

"Will you state, upon your own knowledge, whether the hours of labor have not been considerably increased (that is, in brisk times) since you were acquainted with factories?" "When I went at first to factories, I was at work about eleven hours a-day; but the time has increased to fifteen, to sixteen, and sometimes to eighteen hours."—"Is the labor of the children and young persons in those mills more severe, as well as longer, than it was when you first commenced that business?" "Yes, doubly so; I do not hesitate to say doubly so."

Charles Aberdeen is asked:

"Do you think that there is double the quantity of labor required from the children that there used to be?" "I am confident of it; since I have been working at the firm of Lambert, Hoole, and Jackson, I have done twice the quantity of work that I used to do, and for less wages."

And another passage or two from the same evidence, gives us a little light into the manner in which the *screw* is perpetually applied, in order to get out of the *human machines* the utmost possible quantity of work:

Stephen Binns is asked:

"Does the machinery go more easily now than it used to do?" "If I have a machinery-room to overlook, I have thirty hands in the room to manage this machinery. When I deliver in my note of the time and the work, the master sees what quantity of work has been produced from those hands, and he sees the quantity of money that has been paid, and he goes round the room, and thinks 'I can do with one hand less;' and he says, 'There are five in that row generally—you can do with one less; offer each of them 3*d*. a week more if they will do with one less;' and then by the encouragement, the giving 3*d*. a week for a less quantity of hands, they perform the same work upon that machinery."—"Is the work done equally well?" "Yes; but it is more fatiguing." "But still the children are willing to do so for an advance of wages?" "Yes; I have seen Mr. James and Mr. John Marshall go round the frames, and I have heard say afterwards, that they have asked the girls if they could not mind another spindle or two spindles more, and if they could, they would give them 3*d*. more; that is, if they would mind ten spindles instead of eight."

Joshua Drake is asked:

"What I mean to ask is, whether those who have been employed have not had more to do in a given time?" "Lately they have put three children upon four children's work; it took place three months ago at Mr. Sheepshank's mill; and last Monday morning but one it took place at Bruce, Dorrington, and Walker's, without any notice to the children; and, in consequence of this arrangement, one child in every billy was thrown out of work."

This, then, is the course things are now taking; and from these facts many persons will learn how it comes to pass that an outcry has lately been raised, heretofore unknown, for some regulation of the hours of labor.

The truth is, that a system of gradual increase of toil has been long going on, and the extreme point of endurance has lately been passed. Hence the present cry for relief—a cry which we trust will never cease, until full and complete relief is afforded.

Mr. Sadler's bill, however, is only directed to one point; but that is by far the most important point of the case. Its object is merely to rescue the little children of the manufacturing districts from that most cruel and all but exterminating state of slavery in which they are now held. We call it *slavery*, with deliberation, because, the toil being excessive, destructive of the child's health and morals, and such as no parent ought to subject his child unto,—the parents are yet compelled, by the threat of absolute starvation, to force their children to undertake it. The proof of this coercion is given in the evidence as follows:

William Osburn Esq. is asked:

"Supposing that the parents applying for relief for their children, refused to allow them to labor in mills or factories, in consequence of their believing and knowing that such labor would be prejudicial to their health, and probably destructive of their lives, would they, in the mean time, have had any relief from the workhouse board, or from you, as overseer, merely on the ground that the children could not bear that labor?" "Certainly not."—"Would it be accepted as an excuse for not working, that they could not conform to those long hours of labor?" "Certainly not."—"So that the children of the poor, and their parents, have no alternative in such cases, but submitting their children to this extravagant length of labor, or exposing them to absolute want and starvation, as the consequence of refusing so to be employed?" "None whatever."

Thomas Bennett is asked:

"When you were working in the mill, were you bound, when required, to work those long hours?" "Yes; if I had not done it, my master would have got somebody else that would."—"And the parish officers would not have relieved you if you had left?" "No, they would have said, 'You refused to work.'"—"You would then have been left to starve?" "Yes."

Samuel Colson is asked:

"If you had refused to allow your children to be so worked, you could not get any relief from the parish?" "None whatever."—"So that you had no alternative but that excessive slavery or starvation?" "Yes, we must either submit to their laws, or starve to death, for at no other place could we get them employed."—"Are you not able to support your children without sending them to a mill?" "No; I have not had 2*s*. a week of labor for many weeks together."

Joseph Hebergan is asked.

"Were there other children at the mill that were also made ill by this labor, and who became deformed in like manner?" "Yes, there were some very often sick,

and some were deformed; but the parents who were able to support their children took them away in consequence of seeing that they would be deformed if they did not take them away." "Your mother being a widow, and having but little, could not afford to take you, away?" "No."—"Would the parish have relieved you, if your mother had taken you away?" "No, she has oftentimes been to them, but she was no better for it. I have seen her weep oftentimes, and I have asked her why she was weeping, but she would not tell me then, but she has told me since." "What did she tell you affected her?" "Seeing my limbs give way by working such long hours."

Such, then, is the situation of these poor creatures, as to what is called their *free agency*. In fact no one can read the horrible details contained in the volume of evidence, and imagine for an instant that any human beings would submit to the sufferings there detailed, if it were in their power to escape from them. Into these frightful details we must now, for a short time, enter. Having alluded to them we must justify the language we have used; we will do this, and much more. In fact the common terms of horror and indignation are inadequate to the expression of feelings excited by this dreadful picture. We must therefore leave the poor creatures to tell their story in their own words, without incumbering it with our remarks.

The evil mainly and principally lies in the *excessive length of the labor* exacted. From this source all the other evils of the system flow; and therefore it is, that the main object of Mr. Sadler's bill is to limit the hours of attendance to twelve per day, *i. e.* ten of labor with two for meals.

The following extracts are from Blackwood's Magazine, on the same bill and evidence.

"The following were the hours of labor imposed upon the children employed in a Factory at Leeds the summer before last. On Monday morning work commenced at six o'clock; at nine, half an hour for breakfast; from half past nine till twelve, work. Dinner, one hour; from five till eight, work; rest for half an hour. From half past eight till twelve, (midnight,) work; an hour's rest. From one in the morning till five, work; half an hour's rest. From half past five till nine, work; breakfast. From half-past nine till twelve, work; dinner; from one till half-past four, work. Rest half an hour; and work again from five till nine on Tuesday evening, when the labor terminated, "*and the party of adult and infant slaves*" are dismissed for the night, after having toiled thirty-nine hours, with brief intervals (amounting only to six hours in the whole) for refreshment but none for sleep. On Wednesday and Thursday, *day-work only*. From Friday morning till Saturday night, the same labor repeated, but closed at five—to show that even such masters can be merciful. This is one of the extreme cases, but they are not of very rare occurrence; ordinarily the working hours vary from twelve to fourteen; they are often extended to sixteen; but in some mills (are we right in saying so?) they seldom exceed twelve for children."

* * * * * * *

"Whoever," says Mr. Sadler, "has lived in a manufacturing town, must have heard, if he happened to be awake many hours before light on a winter's morning, *the patter of little pattens on the pavement*, lasting perhaps for half an hour together, though the time appointed for assembling was the same." She works for some hours before breakfast, after what some folks would have called no supper—and then what a breakfast—covered with dust! Nor is she allowed to eat it, such as it is, sitting; but must swallow a mouthful now and then as best she may, standing and working at the beck of that engine.

"At midday, "to dinner with what appetite she may," and some hours after a cup of thin sugarless tea, for nothing else will stay on her stomach. There is a demand—and work must go on till midnight. She gets drowsy, and lies down on the floor to snatch some sleep. The overlooker espies her white face upon her thin arm for a pillow—blue eyelids shut—pale lips apart; and, to cure that lazy trick, dashes over her head, and neck, and breast, and body, a bucket full of water. Well may our legislator laugh at the recital, for all the imps there laugh louder that he at the reality, and it cannot be denied, that the practical joke is of the first water. And now the whole garg of small sweaty sickly slaves is at work in spite of the stupor of sleepiness,—and how think ye do they contrive to keep themselves awake? By all manner of indecencies of look, speech, and action, possible in purgatory. Fathers have sworn to it, and wished they had been childless. Weak, sickly, rickety, chicken-breasted, crooked, decrepit, spine-distorted Sally, scarcely nine years old, to that leering deformed dwarf Daniel, answers obscenity to obscenity, at which the street-walking prostitute would shudder, and fear the downfall of the day of judgment!"

INFANT LABOR IN ENGLISH FACTORIES.

At the close of an article on this subject, in an English magazine—in which many instances of cruel suffering are related—the followg verses are given.*

Many of our readers will find it difficult to realize the scenes we have placed before them—scenes so abhorent to the feelings, as to find admission into the mind only with great difficulty. Verse will sometimes gain a way where dry prose is rejected from the memory. An affecting fact, stated by the witness Gillet Sharp (page 210 of the *Evidence*) has been thrown into rhyme, and we give it, without consulting the writer. Let the reader observe, that it conveys merely a simple statement of a fact which really took place, and which, we fear we must add, is of no uncommon occurrence.

"'Twas on a winter's morning,
The weather wet and wild,
Three hours before the dawning,
The father roused his child;
Her daily morsel bringing,
The darksome room he paced,
And cried, 'The bell is ringing,
My hapless darling, haste!"

'Father, I'm up, but weary,
I scarce can reach the door,
And long the way and dreary,—
O carry me once more!
To help us we've no mother,
And you have no employ;
They killed my little brother,—
Like him I'll work and die!'

Her wasted form seem'd nothing,—
The load was at his heart;
The sufferer he kept soothing
Till at the mill they part.
The overlooker met her,
As to her frame she crept,
And with his thong he beat her,
And cursed her as she wept.

Alas! what hours of horror
Made up her latest day;
In toil, and pain, and sorrow,
They slowly passed away:
It seemed, as she grew weaker,
The threads the oftener broke
The rapid wheels ran quicker,
And heavier fell the stroke.

The sun had long descended,
But night brought no repose;
Her day began and ended
As cruel tyrants chose.

* This last article is taken from Littell's Dollar Magazine, and the name of that editor is a sufficient guaranty for the selection having been made truly and honestly. The verses have been published in some of our northern papers *deprived of the last stanza.*

At length a little neighbor
Her halfpenny she paid,
To take her last hour's labor,
While by her frame she laid.

At last, the engine ceasing,
The captives homeward rushed;
She thought her strength increasing—
'Twas hope her spirits flushed.
She left, but oft she tarried;
She fell and rose no more,
Till, by her comrades carried,
She reached her father's door.

All night, with tortured feeling,
He watched his speechless child;
While, close beside her kneeling,
She knew him not, nor smiled.
Again the factory's ringing
Her last perceptions tried;
When from her straw-bed springing,
'Tis time!' she shrieked, and died!

That night a chariot passed her,
While on the ground she lay;
The daughters of her master
An evening visit pay;
Their tender hearts were sighing
As negro wrongs were told,
While the white slave was dying
Who gained their father's gold!"

EFFECTS OF REMOVING THE FLOWERS AND STEMS OF THE POTATO.

Translated for the Farmers' Register, from the "*Journal d' Agriculture, etc. des Pays Bas.*"

In the last year, the Director of the Royal Horticultural Institute, of Fromont, planted a certain number of patatoes as equal as possible, at the usual distances and in the usual manner, in a soil of the same nature throughout. All the roots received the same tillage, to the second hilling inclusively. The whole plantation was then divided into four lots perfectly equal: the first was left to grow at liberty, and without suppressing, or taking off any part of the plants; from the second lot, all the flowers were removed as they appeared. The third lot had all the shoots cut off at half their length, at the precise time of flowering, so that only the lower leaves were preserved. Lastly, on the fourth lot, all the stem and leaves were cut off close to the earth, or just over the top of the hill. These are the relative difference which these operations caused in the product of roots.

	Product of Potatoes
Lot of which nothing was suppressed, - -	7
Lot of which all the flowers were taken off as they appeared, - - - - - -	8
Lot of which the shoots were cut at half their length, - - - - - - -	5
Lot of which the stalks were cut close to the earth, - - - - - - - - -	2½

We see by this experiment that the suppression of the flowers, or rather the preventing the developement of the fruits and seeds augmented the product of roots one seventh. There are persons who say that they have obtained one fifth more by this procedure; but it is probable that their calculation was deficient in exactness. It is always true that the suppression of the flowers increases the product of the roots.

The same experiment shows that the removing of half the stems and leaves diminished the product of roots by two sevenths: this is a warning to persons who inconsiderately cut the tops of their potatoes, to feed cattle, or for other uses.

Lastly, we see that the fourth lot lost about two-thirds of the product of roots, by having the plants cut off close to the earth—an example striking enough of the utility of leaves, in the production and developement of the lower parts of a plant. It is not only that the leaves draw up the sap, or determine it to amount from the roots to the stems, but they also absorb much nourishment from the air, which they send back to the lower parts of the plant.

Those persons who pretend that by taking away the leaves of beets (or mangel wurtzel) repeatedly during the summer and autumn, they do not injure the growth and ultimate size of the roots, are certainly in error. I known well that there are circumstances in which we are forced to gather the leaves of our beets to feed cattle; but it is not less true, that in this case we are *eating our corn in the blade.*

UNIVERSITY OF VIRGINIA.

The ninth session of this university was closed on Thursday, the 18th of July 1833, by the following Public Exercises, held in presence of the Board of Visiters, and of a large and respectable audience.

1st. An Essay on Popular Education, by Dr. Socrates Maupin, of Albemarle.

2d. An Essay on Fictitious Writing by James L. Cabell, of Nelson.

3d. The chairman of the Faculty announced as in the following list, the names of those Students who had distinguished themselves at the Public Examinations held during the session. The numbers indicate the examinations at which the Student gained this honor, and the names are placed in alphabetical order.

SCHOOL OF ANCIENT LANGUAGES.

Senior Greek Class.

James A. Chapman, of Orange, at the 1st Examination

Junior Greek Class.

Thomas T. Bouldin, Charlotte, 1st and 2d.
Frederick W. Coleman. Caroline, 1st.
Thomas Leigh, Halifax, 1st and 2d.
George Wm. Ranson, Berkeley, 1st.

Latin Class.

Thomas T. Bouldin, Charlotte, 1st and 2d.
Jacob D. Dudley, Richmond city, 2d.
Robert S. French, Norfolk, 2d.
Thomas Leigh, Halifax, 1st and 2d.

Roman Geography.

[One examination in this Class.]
Thomas T. Bouldin, Charlotte.
John H. Christian, Richmond city.
John F. Curtis, Hanover.
Jacob D. Dudley, Richmond City.
Thomas Leigh, Halifax.
George L. Nicholson, Middlesex.
Robert W. Tomlin, Hanover.

SCHOOL OF MODERN LANGUAGES.

French Literature, Senior Class.

James M. Bramham, Albemarle, 2d.
John N. Brockenbrough, Albemarle, 1st.
Thomas L. Patterson, University, 2d.

French Language, Junior Class.

David W. Broadnax, Dinwiddie, 1st.
Archibald Cary, Fluvanna, 1st.
Washington Van Hamm, Ohio, 2d.
George McLeod, Washington city, 1st and 2d.
Socrates Maupin, Albemarle, 1st.
George Wm. Ranson Berkeley, 1st and 2d.
William S. Triplett, Richmond, 1st and 2d.

Spanish Language, Senior Class.

John B. Lynch, Tennessee, 1st and 2d.
Washington Van Hamm, Ohio, 2d.
George Wm. Ranson, Berkeley, 2d.

Spanish Literature, Senior Class.

Thomas H Ellis, Richmond city, 2d.
Washington Van Hamm, Zanesville, Ohio, 2d.
George Wm. Ranson, Berkeley, 2d.

Spanish Language, Junior Class.

Archibald Cary, Fluvanna, 1st.
George McLeod, Washington city, 1st.
Socrates Maupin, Albemarle, 1st.

Italian Language, Senior Class.

Thomas H. Ellis Richmond, city, 1st.

Italian Literature, Senior class.

Thomas H. Ellis, Richmond city, 1st.

Italian Language, Junior Class.

Archibald Carey, Fluvanna, 1st.
George McLeod, Washington city, 1st.
Socrates Maupin, Albemarle, 1st.

German Language Senior Class.

George Schley, Frederick, Maryland, 1st.

German Language, Junior Class.

Washington Van Hamm, Zanesville, Ohio, 2d.
Socrates Maupin, Albemarle, 1st.
Thomas L. Patterson, University, 3d.

SCHOOL OF MATHEMATICS.

Third Class.

John F. Curtis, Hanover, 1st.
Frederick W. Coleman, Caroline, 1st.
Jacob D. Dudley, Richmond, 1st and 2d.
Francis S. Sampson, Goochland, 1st and 2d.
Overton D. Watson, Albemarle, 1st.
Robert H. Weightman, Washington city, 2d.

Fourth Class (Junior Class)

Alexander Baylor, Essex, 1st and 2d.
Thomas T. Bouldin, Charlotte, 1st and 2d.
David W. Brodnax, Dinwiddie, 1st.
John C. Burrus, Huntsville, Alabama, 1st and 2d.
S. D. Cabaniss, Madison county, Alabama, 1st and 2d
John H. Christian, Richmond city, 1st.
John M. Forbes, Stafford, 1st.
John W. Harris, Nelson, 1st and 2d.
John B. Lightfoot, Caroline, 1st.
Richmond Morris, Hanover, 1st.
William W. Minor, Albemarle, 1st.
George L. Nicholson, Middlesex, 1st and 2d.
Thomas B. Robertson, Petersburg, 1st.

SCHOOL OF NATURAL HISTORY.

Willis P. Bocock, Buckingham, 1st and 2d.
Thomas T. Bouldin, Charlotte, 1st and 2d.
John C. Burrus, Huntsville, Alabama, 2d.
John H. Christian, Richmond city, 1st and 2d.
John F. Curtis, Hanover, 2d.
Jacob D. Dudley, Richmond city, 1st and 2d.
John M. Forbes, Stafford, 1st.
John G. Fulton, Augusta, 1st.
John W. Harris, Nelson, 2d.
George L. Nicholson, Middlessex, 1st.
Micajah Pickett, Mississippi, 1st.
Zebulon M. P. Powers, King and Queen, 2d.
Overton D. Watson, Albemarle, 2d.
John R. Woo ls, Albemarle, 2d.

SCHOOL of CHEMISTRY & MATERIA MEDICA.

Class of Chemistry.

William A. Laynham, Essex, 1st and 2d.
Albert G. Chewning, Orange, 2d.
William Davis, Lynchburg, 1st.
John Grattan, Rockingham, 1st.
Joseph M. Newman, Shenandoah, 1st and 2d.
Charles H. Randolph, Richmond, 1st.
Robert A. Read, Bedford, 2d.
Robert W. Tomlin, Hanover, 1st.
William F. Turner, Jefferson, 1st.

Class of Materia Medica.

William A. Baynham, Essex, 1st.
Albert G. Chewning, Orange 1st and 2d.
William Davis, Lynchburg, 1st.
John Grattan, Rockingham, 1st.
Peter T. Johnson, Albemarle, 1st.
James A. Leitch, Albemarle, 1st.
John Mayo, Richmond, 1st.
Samuel Miller, Jr. Rockingham, 1st.
Moses M. Pallen, Richmond, 1st and 2d.
John B. Radford, Bedford, 1st.
Thomas Withers, Jr. Dinwiddie, 1st.
Carter W. Wormeley, Fredericksburg. 1st.

SCHOOL OF MEDICINE. &c.

William A. Baynham, Essex, 1st and 2d.
Albert G. Chewning, Orange, 1st and 2d.
William Davis, Lynchburg, 1st and 2d.
John Grattan, Rockingham, 2d.
James, A. Leitch, Albemarle, 1st.
Moses M. Pallen, Richmond, 1st.
John B. Radford, Lynchburg, 1st.

Medical Jurisprudence

Alexander A. Austin, Halifax, N. C.
Lawrence Carr, Albemarle.
William Finley, Augusta.
John D. Morris, Hanover.
William M. Randolph, Powhatan.
John C. R. Taylor, Frederick.
David H. Turpin, Mississppi.
William S. Woods, Albemarle.

SCHOOL OF ANATOMY AND SURGERY.

William A. Baynham, Essex, 1st and 2d.
James L. Cabell, Nelson, 1st.
Albert G. Chewning, Orange, 1st and 2d.
William Davis, Lynchburg, 2d.
William J. Dulaney, Orange, 1st.
John Grattan, Rockingham, 1st.
Moses M. Pallen, Richmond, 1st and 2d.
James W. Poindexter, Louisa, 2d.
Thomas Withers, Jr., Dinwiddie, 1st.

SCHOOL OF MORAL PHILOSOPHY.

Senior Class.

Alexander A. Austin, Halifax, N. C. 1st and 2d.
Richard Parker, Frederick, 1st and 2d.
Francis S. Sampson, Goochland, 2d.

Junior Class.

Douglas H. Cooper, Mississippi, 1st.
Washington Van Hamm, Ohio, 1st.
John B. Lightfoot, Caroline, 2d.
Charles Minor, Louisa, 2d.
Robert W. Tomlin, Hanover, 2d.
William F. Turner, Jefferson, 1st.

SCHOOL OF LAW.

Senior Class.

Lawrence Carr, Albemarle, 2d.
Burwell G. Garth, Albemarle, 2d.
William M. Randolph, Powhatan, 2d.
John C. R. Taylor, Frederick, 2d.

Junior Class.

Alexander A. Austin, Halifax, N. C. 2d.
John H. Cochran, Loudoun, 1st.
Alexander S. Matthews, Wythe, 1st.
Socrates Maupin, Albemarle, 1st.
William M. Randolph Powhatan, 1st and 2d.
William S. Woods, Albemarle, 1st.

4th. An Oration on our country, by McClurg Wickham of Richmond city.

5th. An Essay on American Literature, by Robert G. Cabell, of Richmond city.

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6th. DEGREES AND CERTIFICATES.

Were conferred, by the Chairman, on the following students, who had been admitted, by the Faculty, to these honors, in the several schools and classes mentioned below.

IN THE SCHOOL OF ANCIENT LANGUAGES.

1st. In the Greek Language and Literature.

Francis S. Sampson, Goochland.
Archibald Cary, Fluvanna.

2d. In the Latin Language and Literature.

Frederick W. Coleman, Caroline.
George G. Minor, Albemarle.
Richard Morris, Hanover.
Francis G. Ruffin, Hanover.

3d. In both of the above Languages.

James H. Davis, Albemarle.
William L. Harris, Prince Edward.
Martin Hart, Middlesex.
Socrates Maupin, Albemarle.
Andrew R. McKee, Albemarle.
Hugh M. Nelson, Hanover.
George Schley, Frederick, Maryland.
John B. Young, Henrico.

IN THE SCHOOL OF MODERN LANGUAGES.

In the French Language.

Thomas H. Ellis, Richmond city.
George Schley, Frederick, Maryland.

IN THE SCHOOL OF MATHEMATICS.
John H. Cochran, Loudoun.
James H. Davis, Albemarle.
Washington Van Hamm, Ohio.
John A. Meredith, New Kent.
Charles Minor, Louisa.
John B. Minor, Louisa.
Zebulon M. P. Powers, King and Queen.
Thomas L. Preston, Washington county.
Charles H. Randolph, Richmond city.
Edmund Ruffin, Prince George.

IN THE SCHOOL of NATURAL PHILOSOPHY.
William F. Brand, New Orleans.
Archibald Cary, Fluvanna.
John H. Cochran, Loudoun.
James H. Davis, Albemarle.
John B. Lynch, Tennessee.
John A. Meredith, New Kent.
Benjamin F. Minor, Albemarle.
Charles Minor, Louisa.
Thomas L. Preston, Washington county.
Charles H. Randolph, Richmond city.
Edmund Ruffin, Prince George.
Francis S. Sampson. Goochland.
Robert C. Stanard, Richmond city.
John Hanson Thomas, Richmond city.
William F. Turner, Jefferson.
John B. Young, Henrico.

IN THE SCHOOL OF CHEMISTRY.
William T. Brand, New Orleans.
James L. Cabell, Nelson.
Richard Cross, Louisa.
James H. Davis, Albemarle.
James A. Leitch, Albemarle.
John B. Lynch, Tennessee.
John B. Minor, Louisa.
Joseph F. Montgomery, Nelson.
Hugh M. Nelson, Hanover.
Moses M. Pallen, Richmond city.
John B. Radford, Bedford.
Robert C. Stanard, Richmond city.
McClurg Wickham Richmond city.
William B. Wilbourn, Nelson.

IN THE SCHOOL of MORAL PHILOSOPHY, &c.
James L. Cabell, Nelson.
John H. Cochran, Loudoun.
William D. Hodges, Nansemond.
Benjamin F. Minor, Albemarle.
Hugh M. Nelson, Hanover.
Robert C. Stanard, Richmond city.
John W. Stevenson, Richmond city.
McClurg Wickham, Richmond city.
John B. Young, Henrico.

In the Class of Political Economy.
Henry R. Carter, Amherst.
William D. Hodges, Nansemond.
John D. Morris, Hanover.
Lilburn H. Trigg, Washington county.
John B. Young, Henrico.

IN THE SCHOOL OF MEDICINE.
(With the Degree of Doctor of Medicine.)
Robert G. Cabell, Richmond city.
William G. Carr, Albemarle.
Richard Cross, Louisa,
Joseph F. Montgomery, Nelson.
Joseph M. Newman, Shenandoah.
Robert A. Read, Bedford.
Benjamin F. Trice, Louisa.
William B. Wilbourn, Nelson.

IN THE SCHOOL OF LAW.
Willis P. Bocock, Buckingham.
William D. Hodges, Nansemond.
Richard Parker, Frederick.
Thomas Semmes, jr. Alexandria, D. C.
Cabell Tavenner, Wood.

7th. The following Students having received separate degrees in the schools of Ancient Languages, Mathematics, Natural Philosophy, Chemistry, and Moral philosophy, were declared Graduates of the University, with the title of Master of Arts of the University of Virginia, viz:
James L. Cabell, Nelson.
Dr. Socrates Maupin, Albemarle.
Hugh M. Nelson, Hanover.
Robert C. Stanard, Richmond city.
McClurg Wickham, Richmond city.

8th The exercises of the day were concluded with an Oration on the Present Age, by Robert C. Stanard, of Richmond city.

TH: JOHNSON, *Sec. of the Faculty.*

FOREIGN AGRICULTURAL PUBLICATIONS.

Preparatory to commencing the publication of the Farmers' Register, arrangments were made to obtain regularly the latest and best periodical works on agriculture from Great Britain, France and Belgium. It was not expected that any considerable portion of European works of this kind would be interesting or useful to the farmers of Virginia: but many articles of value will be thus obtained, and by keeping up the regular and early supply, we shall at least have the satisfaction of knowing that every thing new in the science or practice of agriculture in Europe, of importance to our readers, will be in our possession, and speedily and regularly laid before them. Compared to the value of this object, the cost of obtaining these publications will be trivial—though sufficiently heavy if considered as the price of merely the few articles which will be selected for translation, or republication, in the Farmers' Register. Our first importation has just arrived, too late to allow more than a hasty view of the contents, and to translate the short article which has been inserted. The only work yet received is the *Journal d'Agriculture d'Economie rural, et des Manufactures, des Pays Bas*, for 1830, which though not very late, is the latest volume of that work, its publication having been stopped by the Belgic revolution; and no periodical work on agriculture has since been published in Belgium.

The difficulties attending the first arrangements have still longer delayed the arrival of the works ordered from England, Scotland, and France: but they are expected soon, and afterwards will be regularly furnished, if the continuance of the supply should be found to be desirable.

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